VOLUME XXII NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

MAY, 1911

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17 x 24½ INCHES

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WITH 28 ILLUSTRATIONS E. W. NELSON

Hunting Whales, A World Industry
WITH 35 ILLUSTRATIONS ROY CHAPMAN ANDREWS

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Castle Dome
Mohawk
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Sierra Mojada

Sierra de la Paila

Sierra Mountains

Salt Basin

Sacramento Mts

Guadalupe Mts

Florida Mts

Hueco Mts

Organ Mts

Franklin Mts

Finlay Mts

Rio Grande

Rio Conchos

Rio Florido

Rio Nazas

Rio Aguanaval

Rio Nasas

Rio Salado

Rio Pecos

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Rio Grande del Organ

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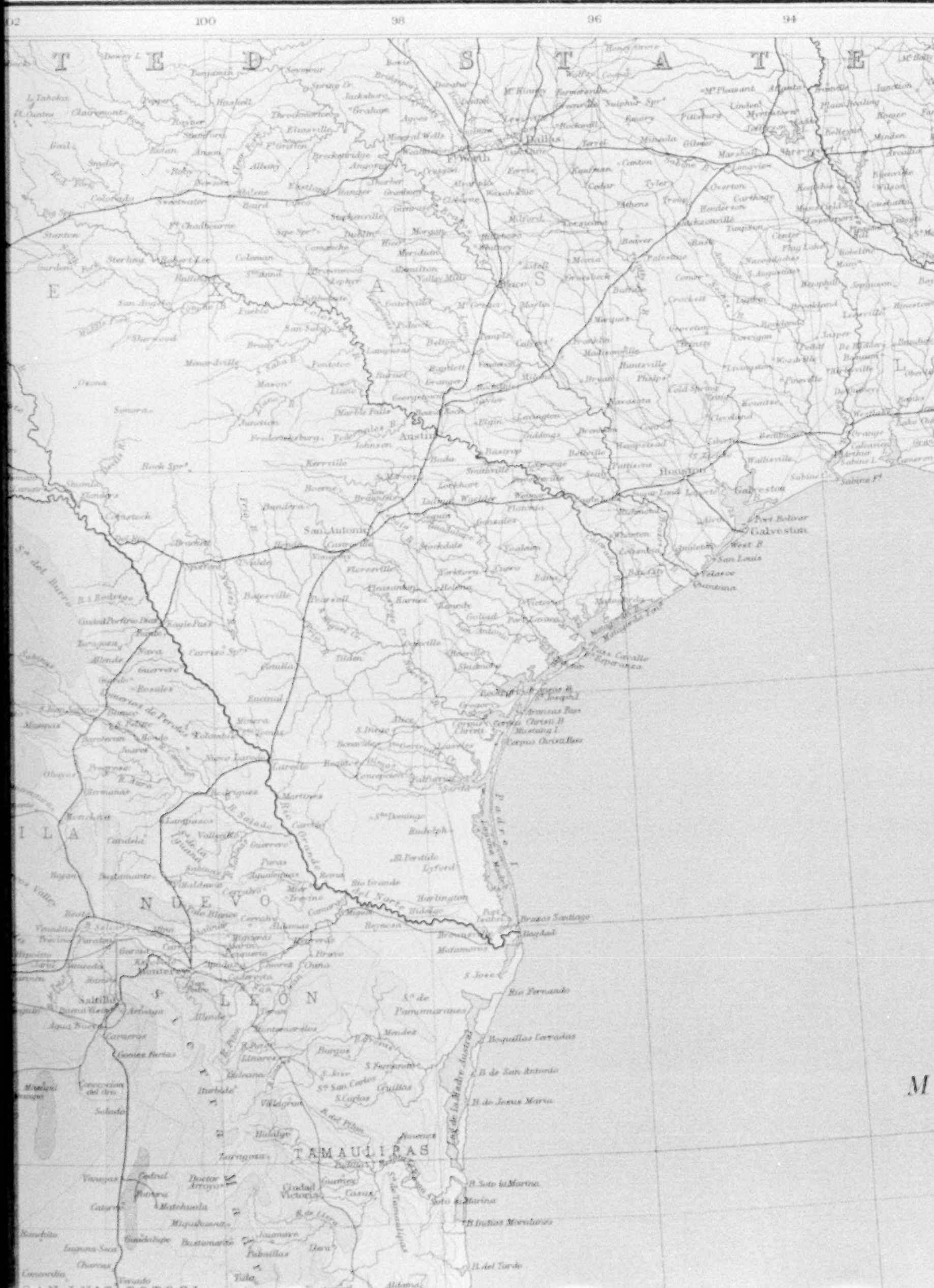
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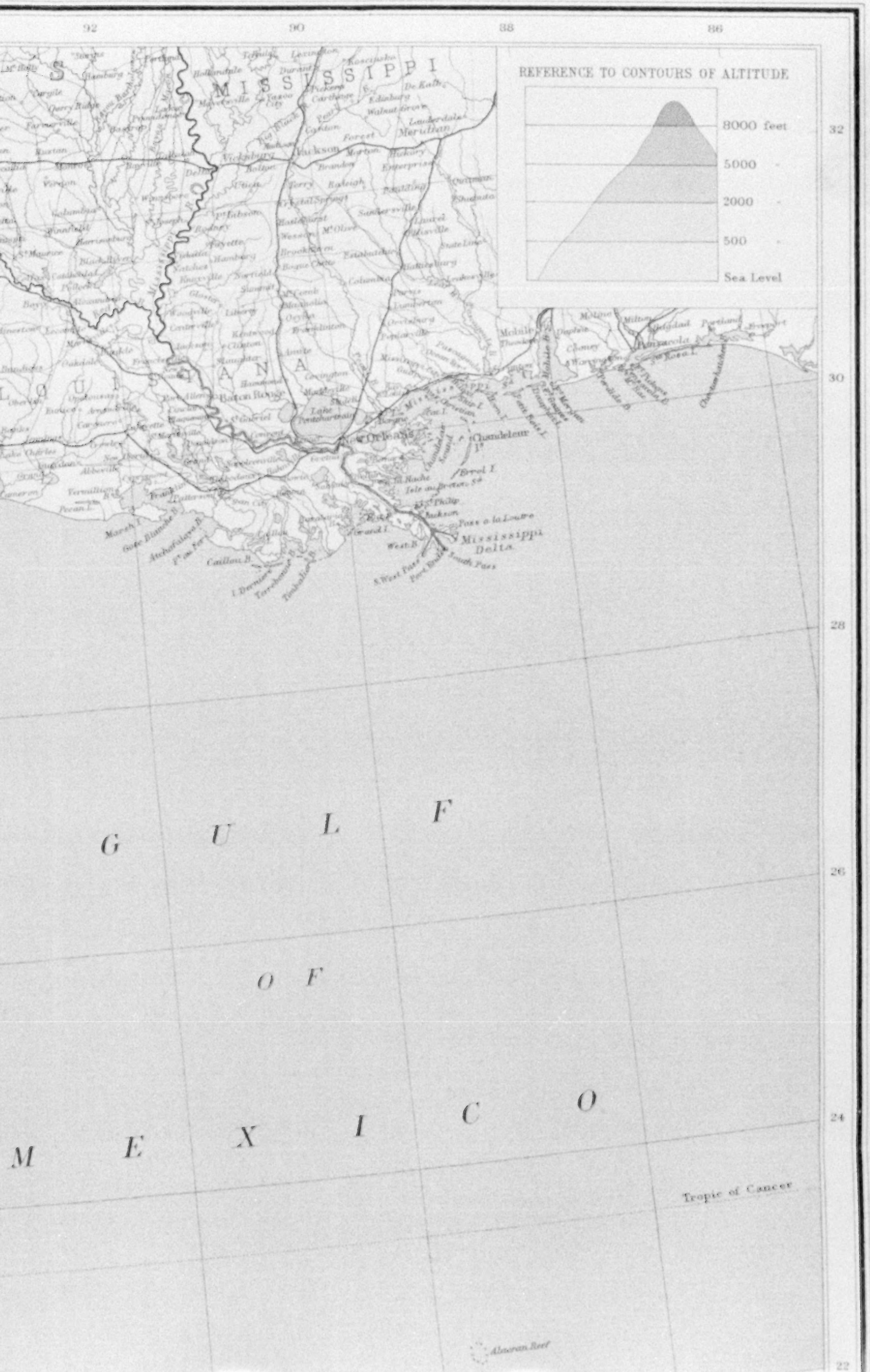
M



REFERENCE TO CONTOURS OF ALTITUDE
8000 feet
5000
2000
500
Sea Level
92
90
88
86
32
30
28
26
24
22
MISSISSIPPI
LOUISIANA
Vicksburg
Jackson
Meridian
Baton Rouge
New Orleans
Mobile
Pensacola
Chandeleur Is
Mississippi Delta
Pass a la Loutre
South Pass
Tropic of Cancer
Alacran Reef
G U L F
O F
M E X I C O

THE

NATIONAL GEOGRAPHIC MAGAZINE

MAP OF

MEXICO

PREPARED BY J. G. BARTHOLOMEW,

GILBERT H. GROSVENOR, EDITOR.

Scale 1: 5,000,000

English Miles

0 20 40 60 80 100 150 200

Railways

Tropic of Cancer

24

22

20

18

16

114 112 110

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SINALOA
DURANGO
ZACATECAS
SAN LUIS POTOSI
TEPIC
AGUASCALIENTES
GUANAJUATO
JALISCO
COLIMA
MICHOACAN
OCEAN
Durango
Mazatlan
Las Tres Marias
Guadalajara
Colima
Manzanillo
Tepic
Mita Pt.
Banderas B.
C. Corrientes
Pt. Farallones
Black Rd.
Tejupan Pt.
Petacalco B.
Salado
Saltillo
Monterey
Lagos
Leon
Silao
Guanajuato
Morelia
Uruapan
Zacatecas
Fresnillo
Sombrerete
Durango
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GUERRERO
OAXACA
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M E X I C O

Tropic of Cancer

Alacran Reef

B a n k of C a m p e c h e

The Triangles

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M P E C H E

C A M P E C H E

Q U I N T A N A R O O

Y U C A T A N

T A B A S C O

C H I A P A S

G U A T E M A L A

BRITISH HONDURAS

Gulf of Honduras

Progreso
Sisal
Merida
Celestun
Campeche
Champoton
Seibaplaya
Lerma
Isla del Carmen
Laguna de Terminos
Palizada
Frontera
Tabasco
Balancan
Tenosique
Pichucalco
Tuxtla Gutierrez
S. Cristobal
Tres Picos
Volcan de Tacana
Soconusco
Tapachula
Ocosingo
Comitan
Coban
Peto
Valladolid
Izamal
Tekax
Ticul
Muna
Uxmal
Acanceh
Tixkokob
Motul
Telchac
Lagartos
Yaxcaba
Tizimin
Espita
Calotmul
Cansahcab
Dzitas
Sotuta
Chichenitza
Calkini
Hecelchacan
Bolonchen
Lerma
Lagartos
Lake Chichankanab
Santa Cruz de Bravo
Bacalar
Chetumal
Chetumal Bay
Lake Bacalar
Lake Concepcion
Lake Milla
Lake Peten
Lake Yzabal
Lake Amatique
Rio Dulce
Rio Motagua
Rio Chamelecon
Rio Ulua
Rio Chixoy
Rio Usumacinta
Rio Grijalva
Rio Tulija
Rio Tonala
Rio Mezcalapa
Rio Coatzacoalcos
Rio Champoton
Rio Candelaria
Rio Hondo
Rio Belize
Rio Sibun
Rio Grande
Rio Nuevo
Rio Chiquito
Rio Palizada
Rio Chilapa
Rio Tapijulapa
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Rio Lacantun
Rio Chacamax
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XUM

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XUM

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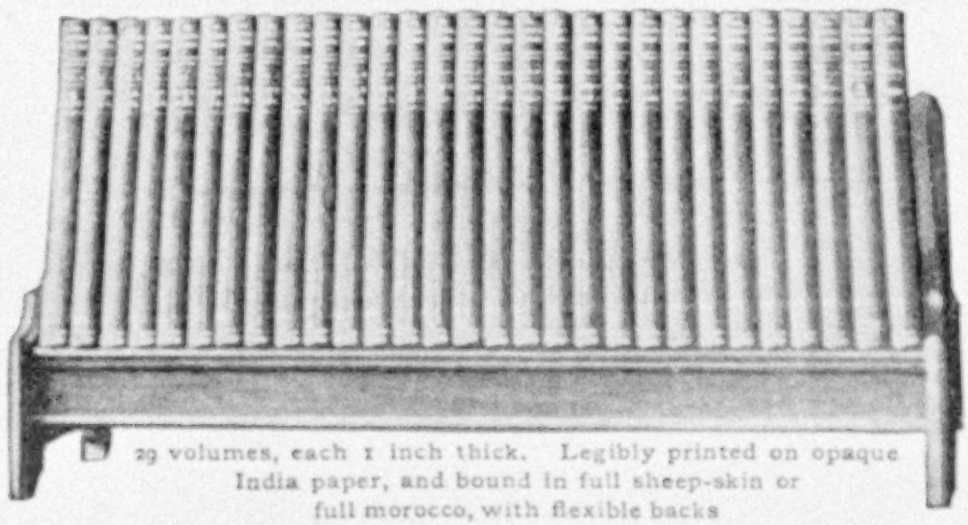

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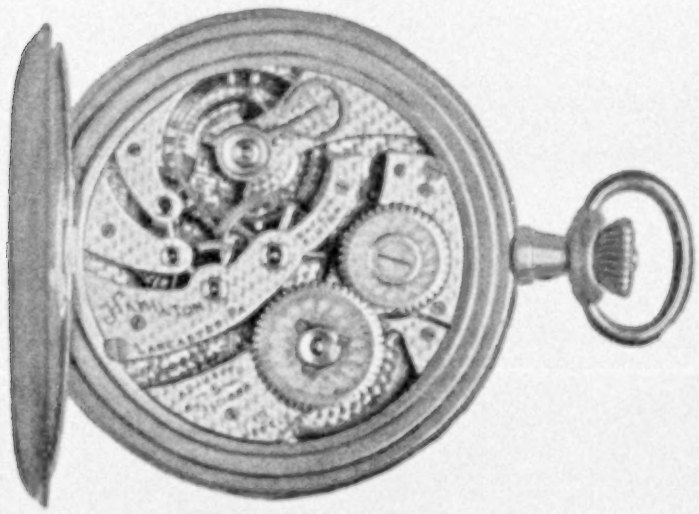

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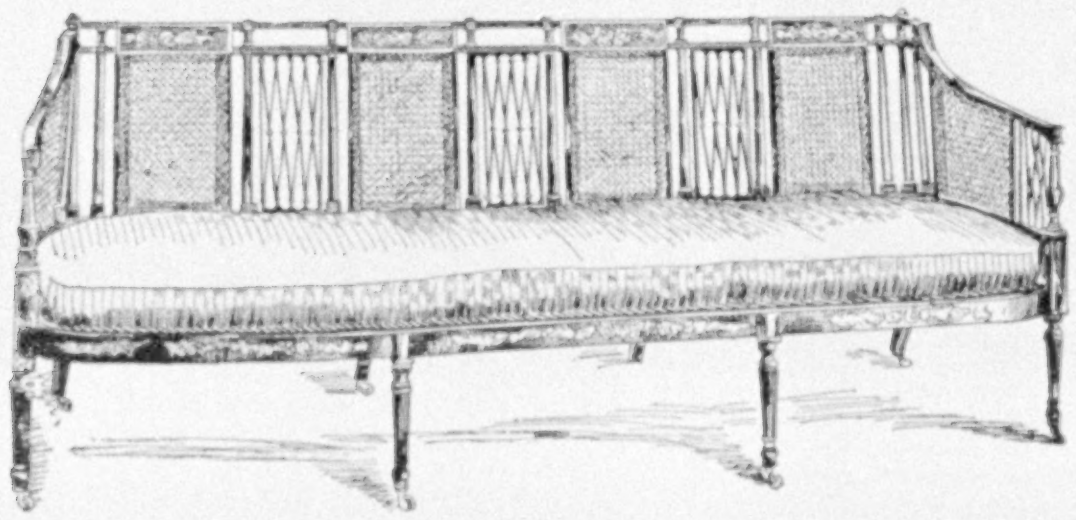

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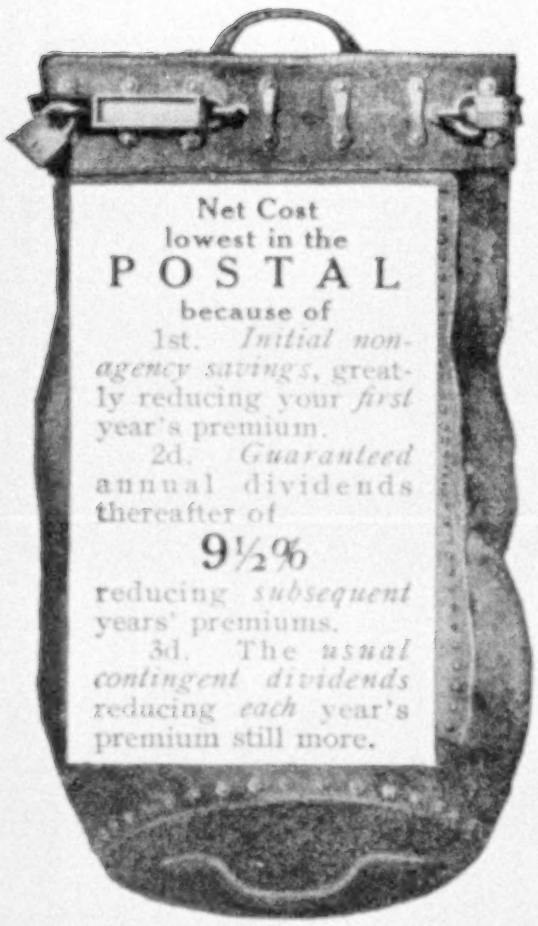
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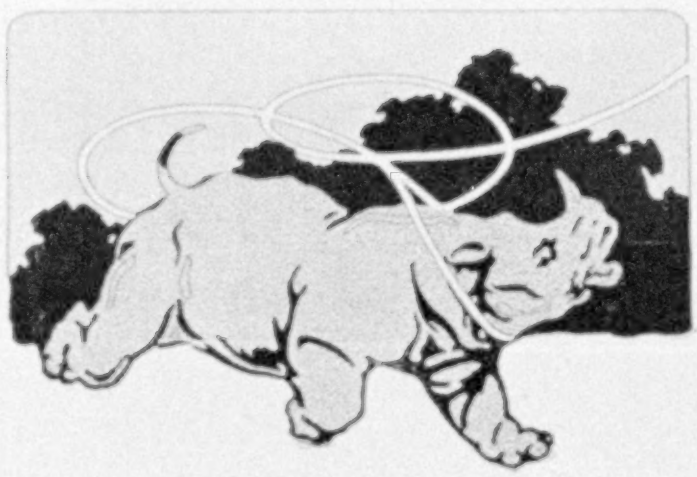

By GUY H. SCULL

Field Manager of the Expedition

with Introduction by

THEODORE ROOSEVELT

and foreword by

CHARLES S. BIRD

32 Illustrations from the Moving Picture Films taken on the Expedition

LAST YEAR Colonel C. J. Jones, or "Buffalo Jones," as he is popularly called, headed an expedition to East Africa to prove that our Western cowboy could rope and capture the savage beasts of that country. In the face of ridicule from experienced British hunters and in spite of the terrific climate and the scarcity of game, he and his men succeeded in taking by ropes alone most of the great East African animals, including wart-hog, eland, hartebeest, giraffe, rhinoceros and lion.

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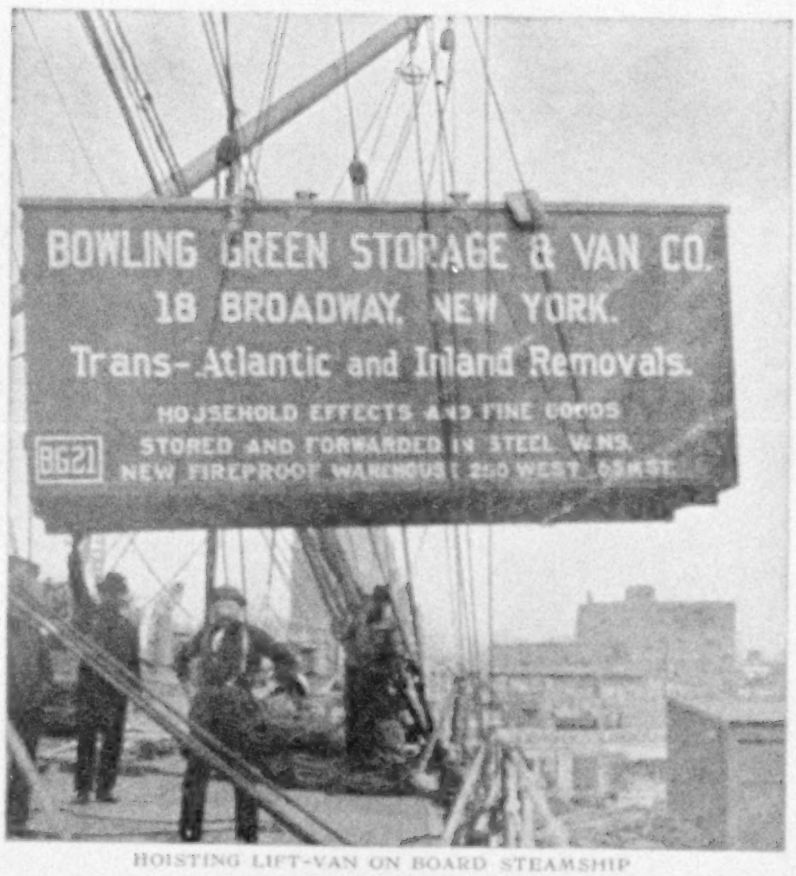
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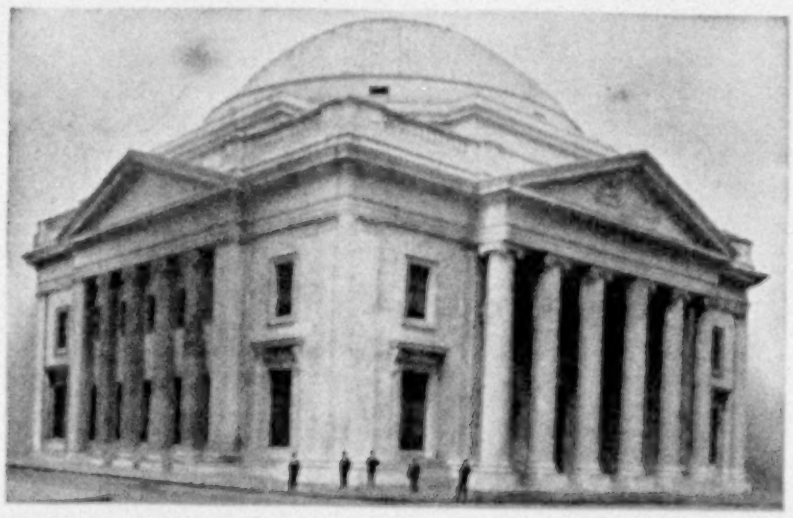

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VOL. XXII, No. 5 WASHINGTON MAY, 1911

THE NATIONAL GEOGRAPHIC MAGAZINE

SHORE-WHALING: A WORLD INDUSTRY

By Roy Chapman Andrews

Assistant Curator of Mammals, American Museum of Natural History

With Photographs by the Author

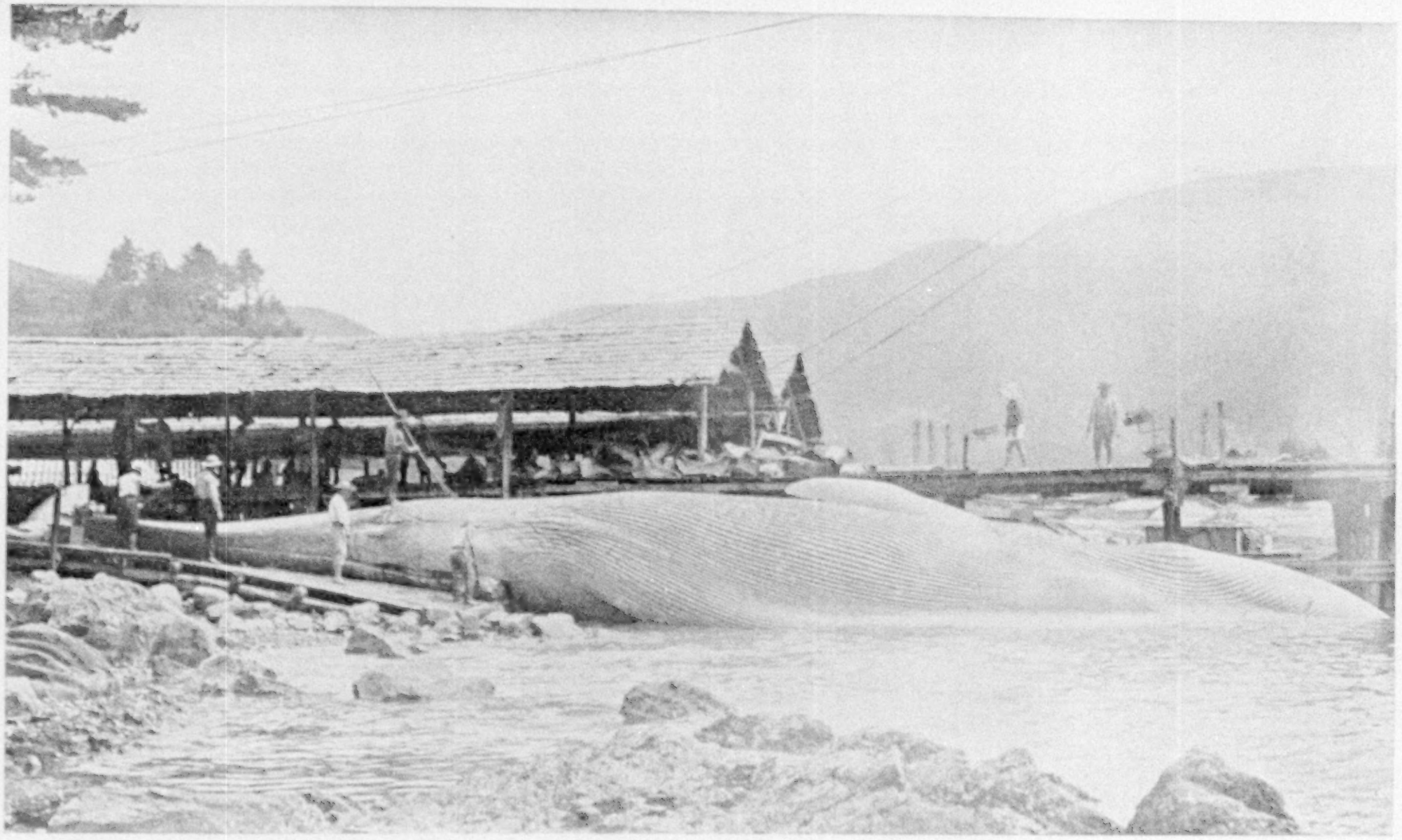
IF THE European and American people could be educated to the point of eating the canned flesh of animals which individually yield as much as 80,000 pounds of meat, what a wonderful food supply would be within reach of the poor in our great cities! In Japan this has actually been accomplished and hundreds of tons of whale flesh are sold in the markets of all the large towns and villages to people who would otherwise have little variety to their diet of rice and fish.

This great meat supply has been put into their hands indirectly by a Norwegian, for it was not until 1864, when Swend Foyn invented the harpoon-gun, that whales could be taken in such a manner as to allow any parts except the oil and baleen (the "whalebone" of commerce) to be utilized.

With the further development of the harpoon-gun grew up a new and great industry, for it made possible the capture of a group of whales known as rorquals, or "finners," in sufficient numbers to warrant the erection of stations at certain points on the shore where the animals could be brought in and the huge carcasses converted into commercial products. Previously these whales had been little troubled by the men who hunted in a small boat with a hand harpoon and lance, for the great speed of the animals and their tendency to sink as soon as killed, as well as their thin blubber and short, coarse baleen, made them unpopular with the early whalers.

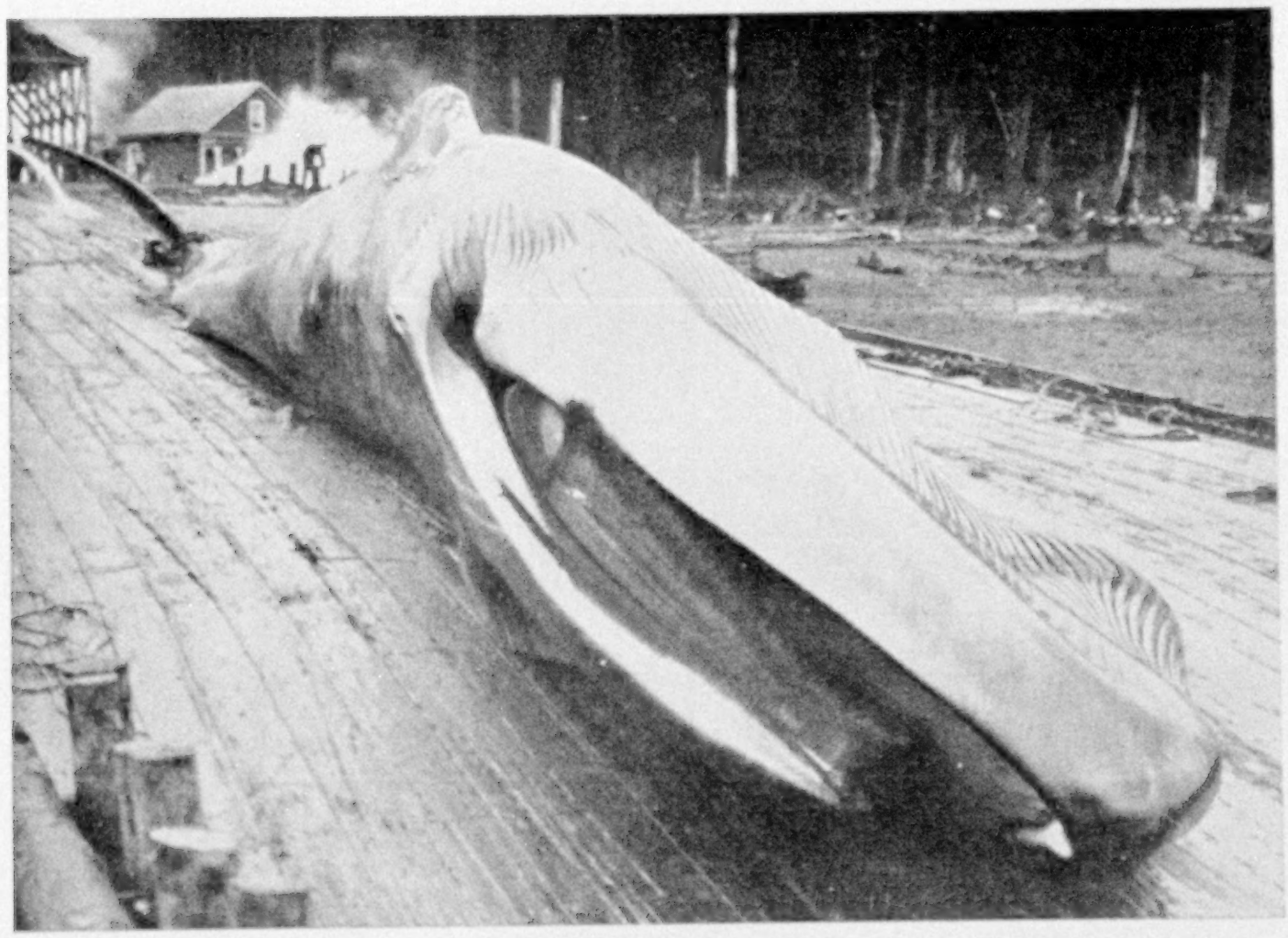
In a few years stations had sprung up on the coasts of Norway in every available place, and later reached across the Atlantic to the American shores. Newfoundland became the first hunting grounds for the whalers here, and only a few years ago as many as 18 stations were in operation on that island and the immediate vicinity.

The great success of the Norwegian methods attracted so much attention that stations were erected in every part of the world where conditions were favorable—in British Columbia, southeastern Alaska, Bermuda, South America, and the islands of the Antarctic; on the coasts of Japan, Korea, Africa, and Russia. Australia is soon to be invaded, and only a few months ago a company announced their plans for carrying on operations on a large scale in the Aleutian Islands. In New Zealand, hump-



A BIG BLUE OR SULPHUR-BOTTOM WHALE: JAPAN

"The blue or sulphur-bottom whale found in all our oceans is not only the largest animal that lives today, but is also, so far as is now known, the largest animal that has ever existed on the earth or in its waters. I have heard many stories of the almost incredible way in which these animals can pull, but was at first inclined to doubt them. Later, when I saw a blue whale with a harpoon between the shoulders drag the ship, with engines at full speed astern, through the water almost as though it had been a rowboat, I began to listen with more respect" (see page 427).



A BLUE WHALE: VANCOUVER

Although the mouth is enormous, large enough in fact to permit 10 or 12 men to stand upright in it, the throat measures only about 9 inches in diameter (see page 427)

back whales are being taken in wire nets, and so in nearly every part of the globe the world-hunt goes on.

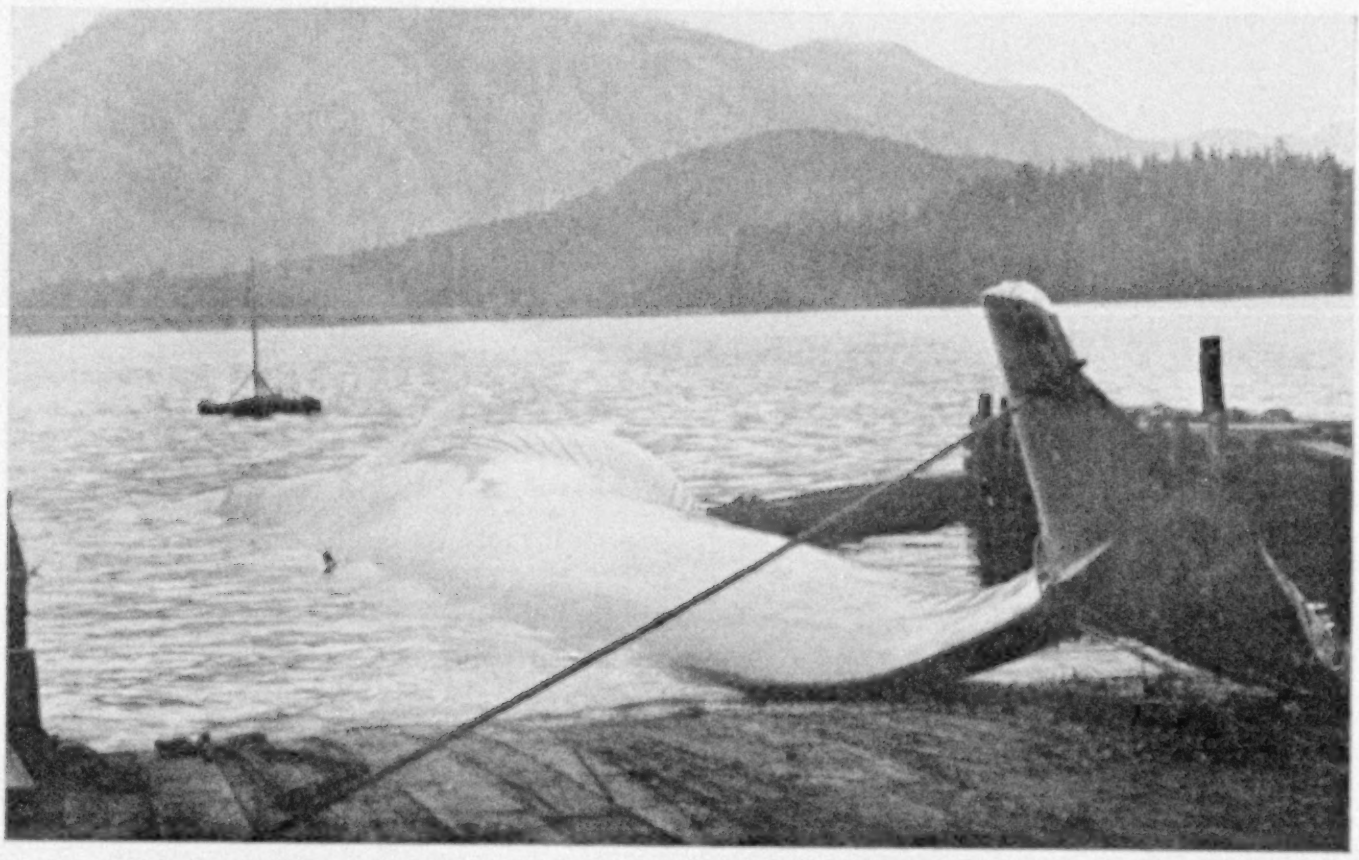
And what is to be the result of this wholesale slaughter? Inevitably the commercial extinction of the large whales, and that within a very few decades. In some localities this has already taken place and all the whales have been killed or driven from their feeding grounds.

This method of capture has, however, made possible a careful study by naturalists of most of the species of large whales and their habits, besides enabling museums to secure skeletons and other specimens for exhibition. Thus, when the American Museum of Natural History in New York city began to gather such material, it led to a series of expeditions which carried the writer to a number of stations in widely separated parts of the world.

THE ENORMOUS BODIES EASILY HANDLED

I will never forget my intense surprise at the extraordinary ease and quickness with which the enormous carcasses are handled when I first saw a whale "cut in." It was at Sechart, in Barclay Sound, on the west coast of Vancouver Island. Here, as at all of the American stations, the operations are carried on in the Norwegian way.

The ship had arrived at 1.30 a. m. with three humpbacks, which were left floating in the water, tied to the end of the wharf, near a long inclined platform called the "slip." Work began at seven o'clock, and, as I had only just been awakened, I ran out without waiting for breakfast, thinking that there would be ample time to eat when the operations were under way. I soon learned, however, that there were no "breathing



A BLUE WHALE: VANCOUVER

Specimens of this whale have been measured which reached a length of 87 feet, and, in all probability, weighed as much as 75 tons (see page 427)

spells" when whales were being cut in, and every soul was at his work until the whistle blew for dinner at noon.

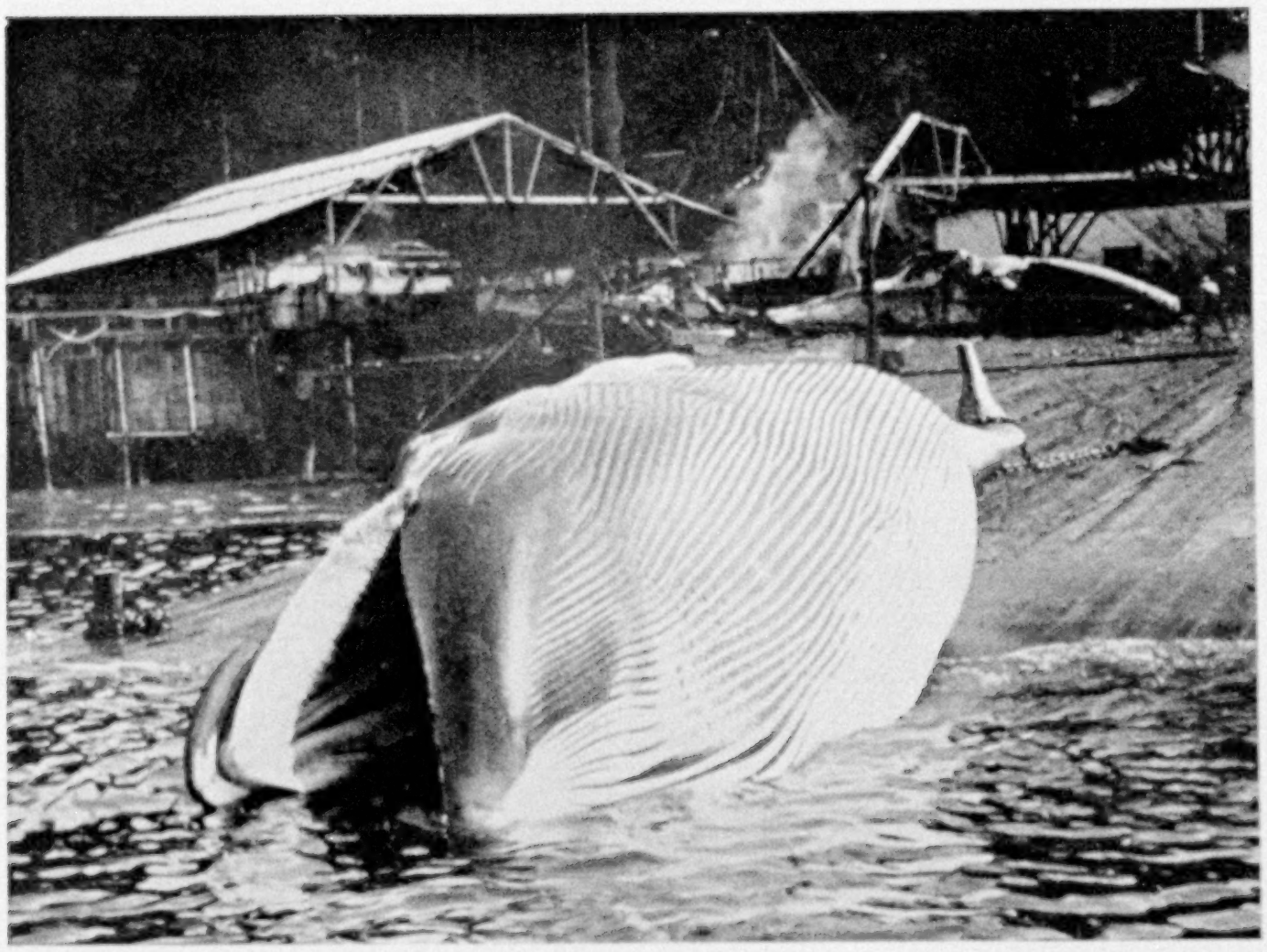
A heavy wire cable was made fast about the posterior part of one of the whales just in front of the tail, or "flukes," and the winch started. The cable straightened out, tightened, and became as rigid as a bar of steel. Slowly foot after foot of the wire was wound in and the enormous carcass, weighing perhaps 45 tons, was drawn out of the water upon the slip.

One of the Japanese (for men of six nationalities—Chinese, Japanese, Norwegians, Newfoundlanders, Indians, and Americans—are employed at these west-coast stations) scrambled up the whale's side, and balancing himself on the smooth surface by the aid of his long knife, made his way forward to sever at the "elbow" the great side fin, or flipper, 16 feet in length.

THE WHALES ARE PEELED LIKE AN ORANGE

Before the carcass was half out of the water other cutters, or "flensers," as they are called, had begun to make longitudinal incisions through the blubber along the breast, side, and back, and from the flukes the entire length of the body to the head. The cable was then made fast to the blubber at the chin, the winch started, and the great layer of fat stripped off exactly as one would peel an orange. When the upper side had been denuded of its blubber covering, the whale was turned over by means of the "canting winch" and the other surface flensed in the same manner.

The blubber is a layer of fat of varying thickness which covers the entire body of all whales, porpoises, and dolphins and keeps the animal warm. It acts exactly as the feathers of birds or the hair of land mammals—as a non-conductor to prevent the natural heat of



A FINBACK WHALE: VANCOUVER (SEE PAGES 428 AND 437)

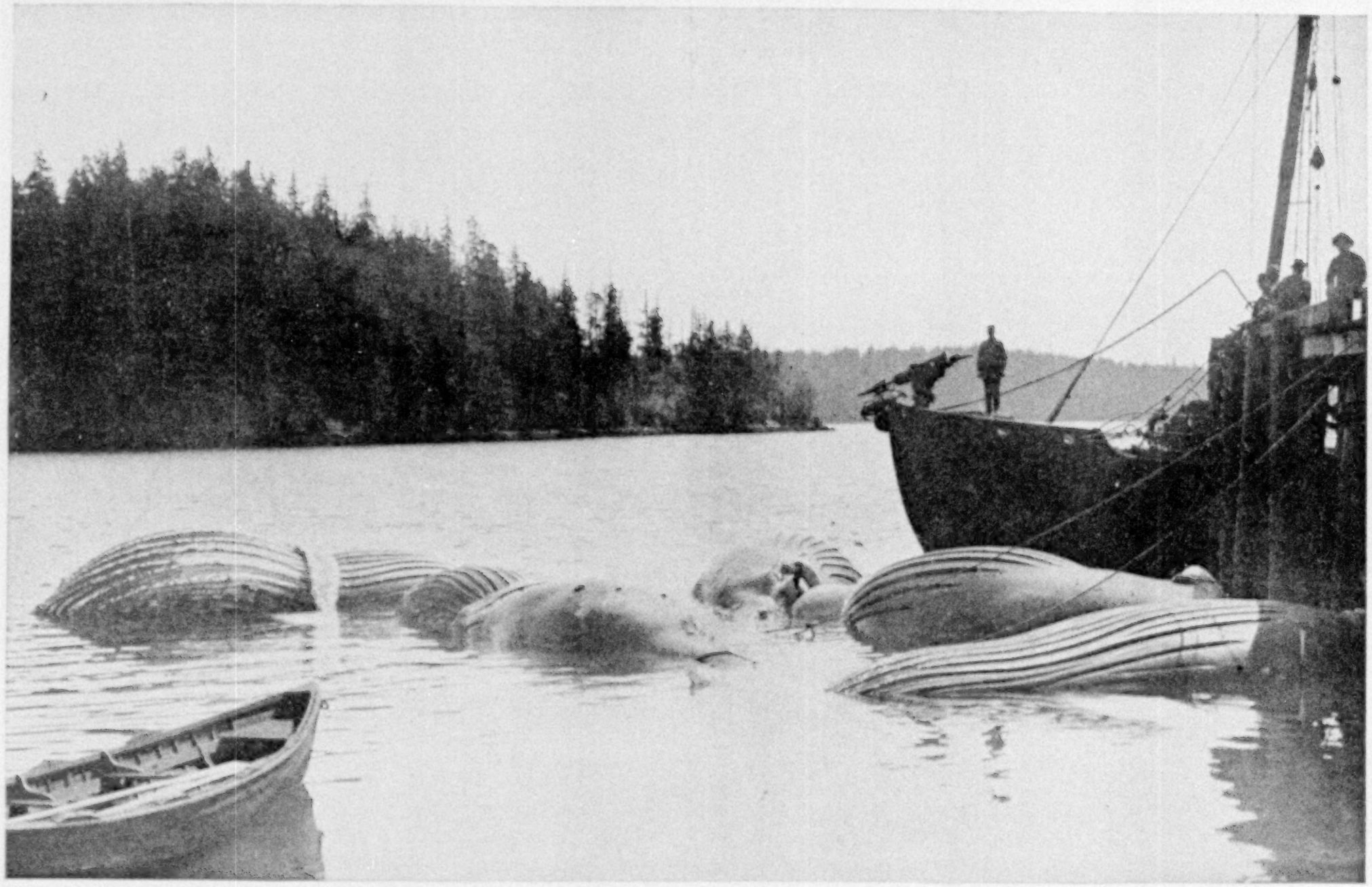
the body from being absorbed by the water in the one case, and the air in the other. On the great bowhead, or Greenland right whale, which lives in the intensely cold waters of the Arctic Ocean, the blubber is 12 or 14 inches thick in some places (see pages 427, 435, 438).

When the "blanket pieces," as the blubber strips are called, were torn from the carcass, they were cut into large oblong blocks and fed into a slicing machine, chipped to small bits, carried upward and dumped into enormous vats, to be boiled or "tried out" for oil.

The carcass had meanwhile been split open by chopping through the ribs of the upper side, a heavy hook was attached to the tongue bones at the throat, and the entire mass of heart, lungs, liver, and intestines drawn out at once. The body was then hauled to the "carcass platform," at right angles to the "flensing slip," the flesh torn from the bones by the aid of the winch, and the skeleton disarticulated.

Both flesh and bones were piled separately into great open vats which bordered the carcass platform, and boiled to extract the oil. The flesh was then artificially dried and sifted, thus being converted into a very fine guano, and the bones pulverized to form "bone meal," also a fertilizer. Even the blood, of which there are several tons in a large whale, was carefully drained from the slip into troughs, boiled, dried, and made into guano. Finally, the water in which the blubber had been tried out was converted into glue.

The baleen, or whalebone, which alone remained to be disposed of, was thrown aside, to be cleaned and dried as opportunity offered. The baleen of all the rorquals is short, coarse, and stiff, and

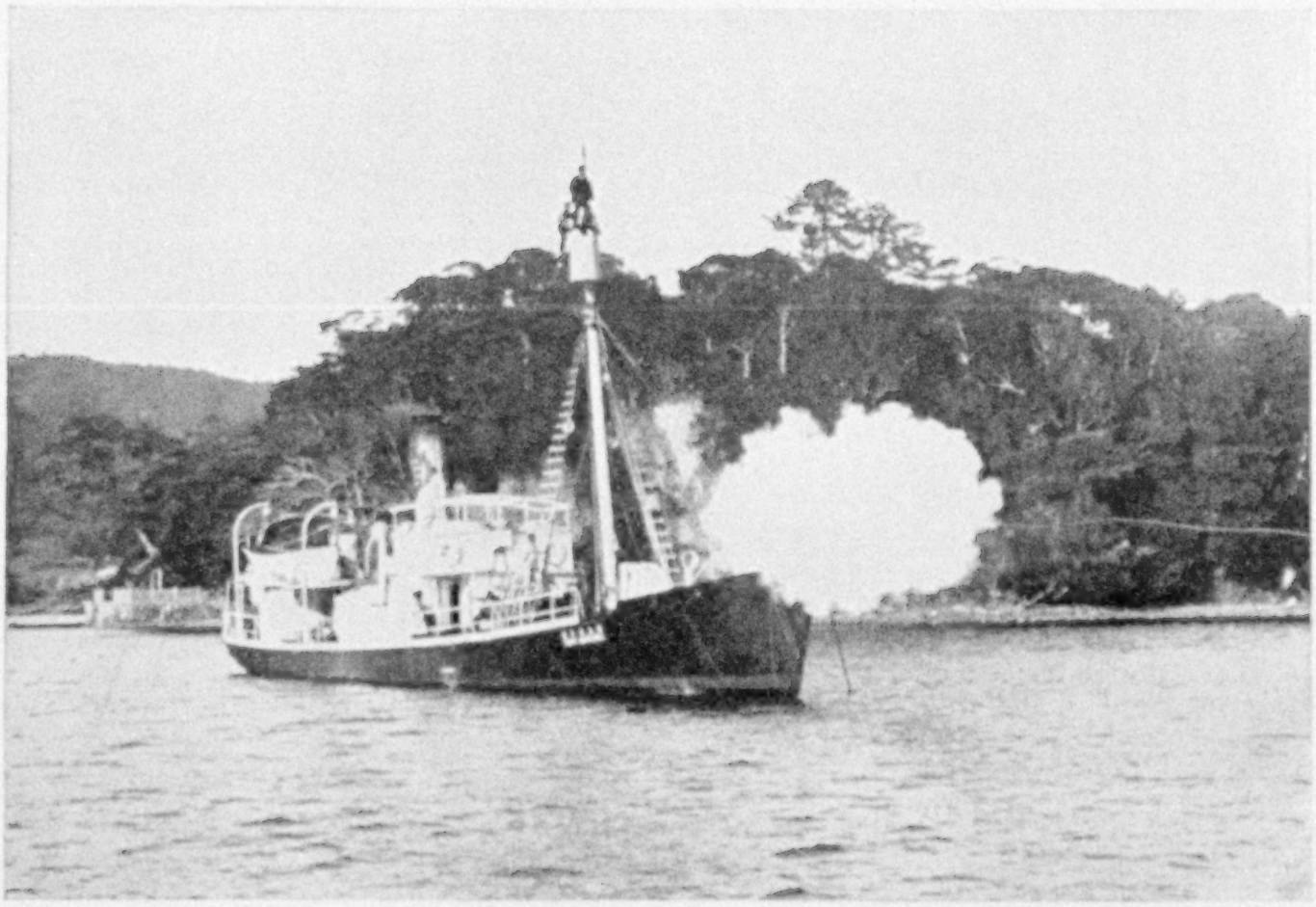


THE CARCASSES OF FIVE HUMPBACK WHALES: VANCOUVER

This whale is considerably smaller than the blue whale, its maximum size being 55 feet (see pp. 428–430). Photo by courtesy of World's Work

A VERY WHITE HUMPBACK WHALE, VANCOUVER: NOTE THE CRAB-LIKE FLIPPER

"Its body is thick and heavy, with enormous side fins, or flippers. These great paddles are one-quarter the length of the entire body, and a single one from a whale 49 feet long weighed on the station scales 950 pounds" (see pages 428–430)



A MODERN WHALER IN PORT

The crew are practicing by shooting at a floating target

in Europe and America has but little value. In Japan, however, it is made into many useful and beautiful things.

This, with the exception of minor details, is the method of handling whales which the Norwegians developed after years of experimenting, and which is followed in almost all other parts of the globe except Japan.

THE JAPANESE WHALE FISHERIES

In the Island Empire shore-whaling as a great industry has developed during the last 15 years, but nowhere else in the world are the by-products so perfectly utilized. The Japanese have not only extracted the best from the European methods of preparing whales and adapted it to their peculiar needs, but have also added much from their own experience which whalemen of other nations would do well to recognize.

The Japanese stations are usually situated in or near one of the little fishing villages which dot the islands in every bay or harbor. In some instances the whales are drawn out of the water upon a slip in the manner learned from the Norwegians, but the more usual way of cutting in is a method of their own adoption.

At the end of a wharf extending into deep water a pair of long, heavy poles are erected, inclined forward, and joined at their extremities by a massive crosspiece. From this the great blocks, through which run the wire cables of the winch, are suspended.

The first whale which I saw cut in by the Japanese was an enormous sulphur-bottom, 80 feet in length. I had been at sea for several days on one of the ships, and as we swung into the bay from the open ocean, the whistle echoing among the hills gave warning of our coming. The little vessel, towing a car-

cass almost as long as herself, plowed slowly up to the wharf, and after a rope from the shore had been made fast to the flukes of the whale, dropped it into the water and backed off to anchor in the bay.

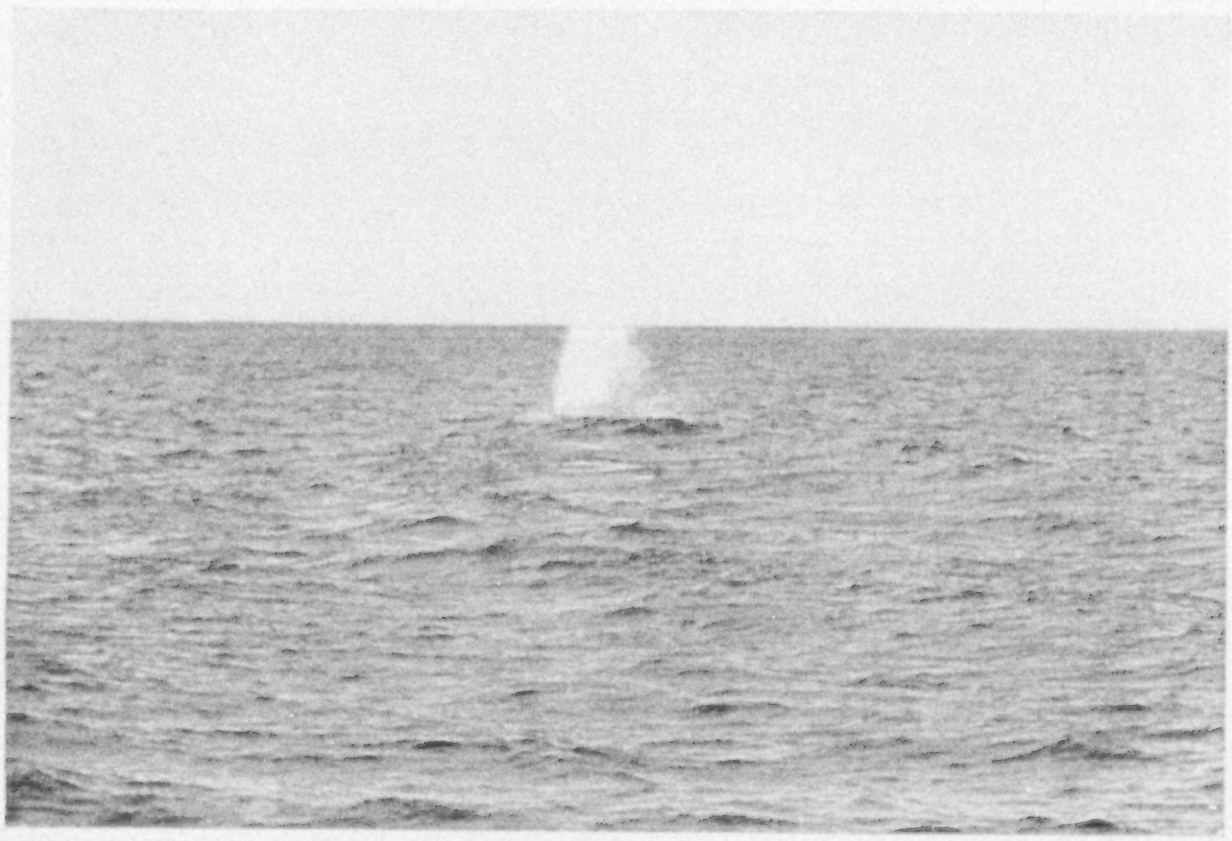
Immediately a heavy chain was made fast about the body just forward of the tail, the winch started, and the whale drawn slowly into the air over the end of the wharf. As it came upward the eager cutters attacked it, slicing off enormous blocks of flesh and blubber, which were at once seized by "hookmen" and drawn to the back of the platform. Meanwhile two other cutters were at work in a "sampan" dividing the carcass just forward of the dorsal fin. The entire posterior part of the whale was then drawn upward and lowered on the wharf to be stripped of blubber and flesh. Transverse incisions were made in the portion of the body remaining in the water, a hook fastened to a blanket piece, and as the blubber was torn off by the winch the carcass rolled over and over. The disjointed head was hoisted bodily onto the pier. Section by section the carcass was cut apart and drawn upward to fall into the hands of the men on the wharf and be sliced into great blocks two or three feet square (see page 412).

Photo by courtesy of World's Work

THE HARPOON GUN USED FOR KILLING AND CAPTURING WHALES (SEE PAGE 423)

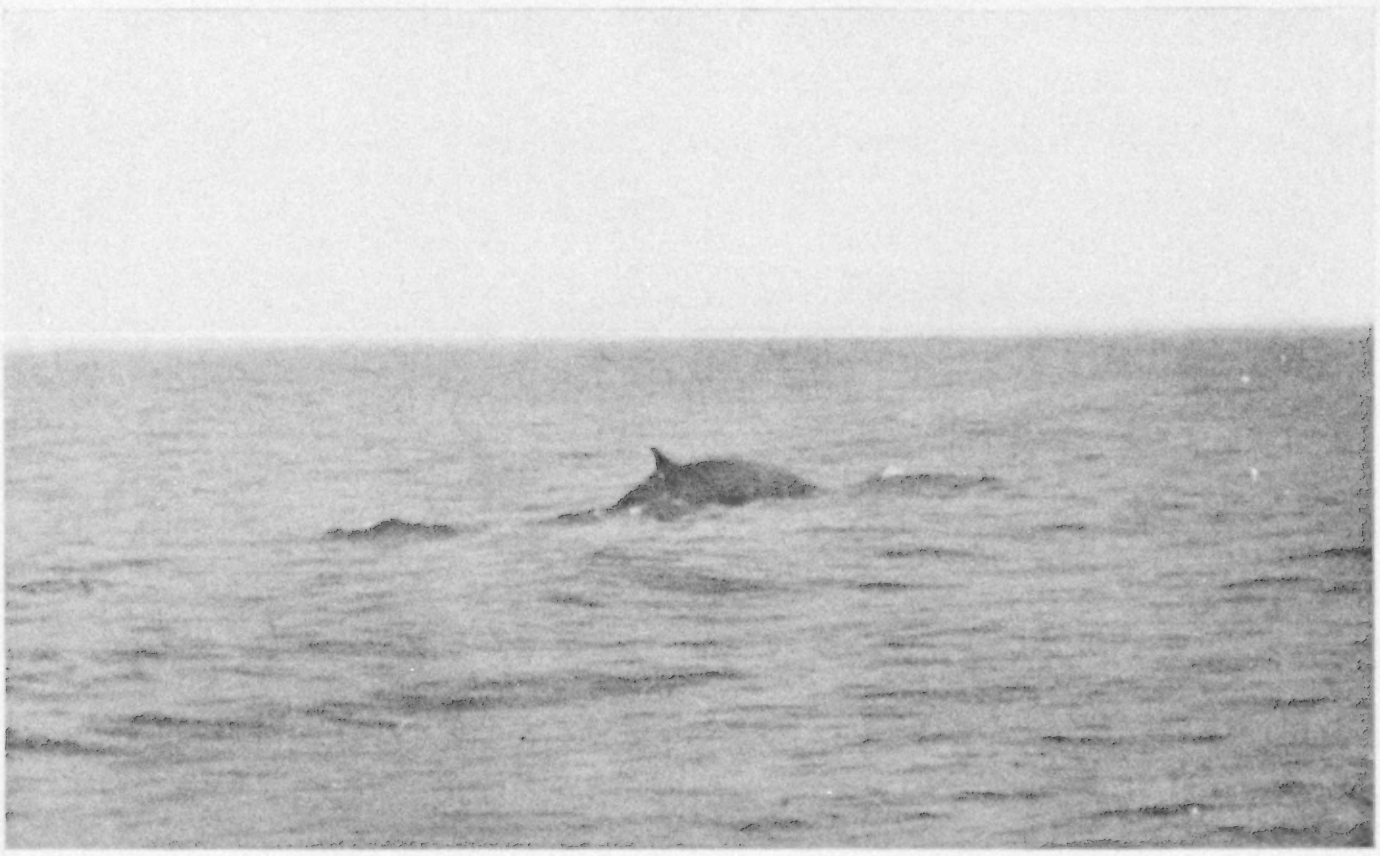
The scene was one of "orderly confusion"—men, women, and girls laughing and chattering, running here and there, sometimes stopping for a few words of banter, but each with his, or her, own work to do. Above the babel of sounds, the strange, half-wild, meaningless chant, "Ya-rá-cū-ra-sa," rose and died away, swelling again in a fierce chorus as the sweating, half-naked men pulled and strained at a great jawbone or swung the hundred-pound chunks of flesh into the waiting hand-cars which carried them to the washing vats. Sometimes a kimona-clad, bare-footed girl slipped on the oily boards or treacherous, sliding, blubber cakes and sprawled into a great pool of blood, rising amid roars of laughter to shake herself, wipe the red blotches from her little stub nose, and go on as merrily as before.

It was essentially a good-natured crowd, working hard and ceaselessly, but deriving as much fun from their labor as though it was a holiday. The



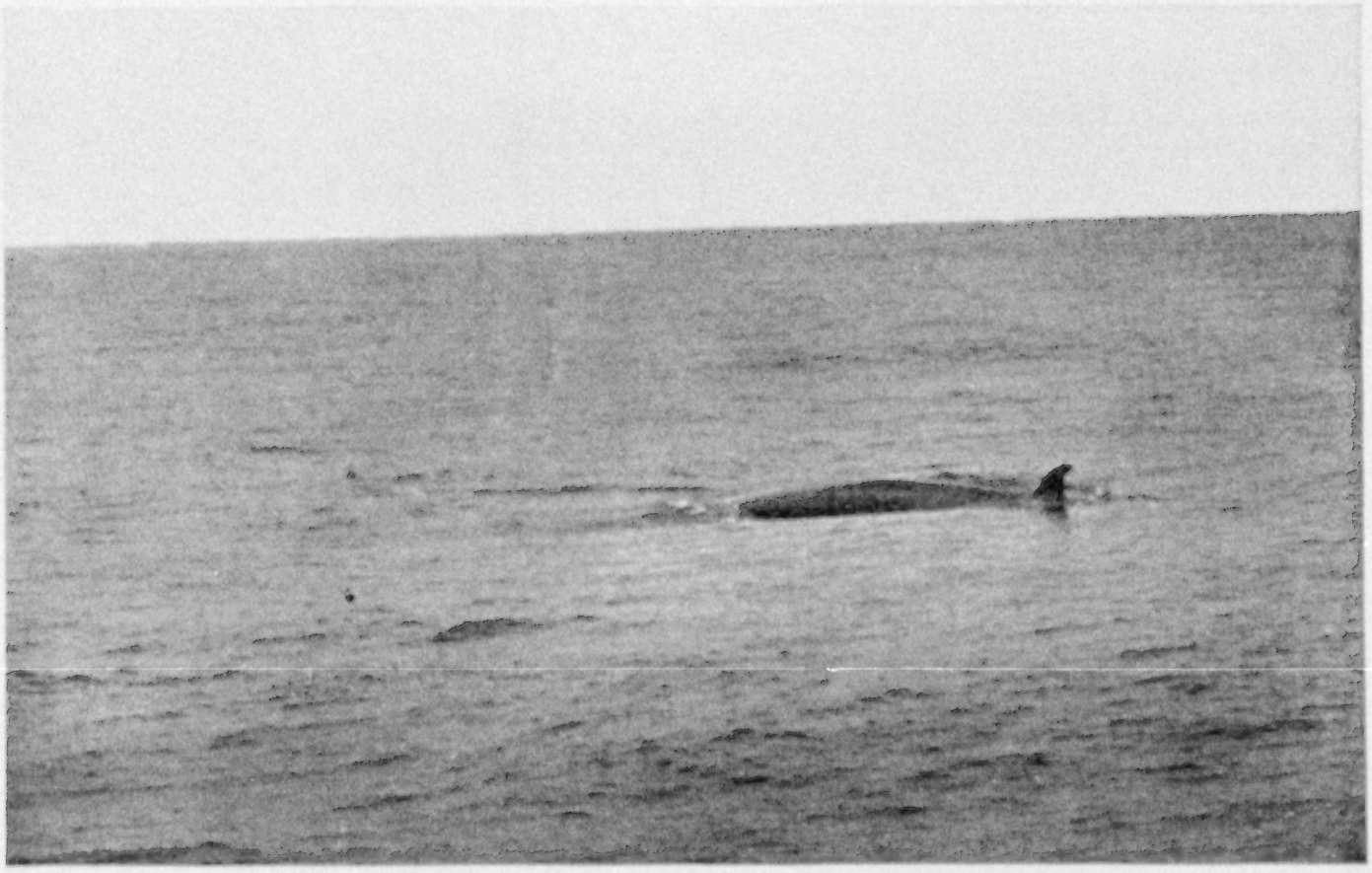
A SEI OR SARDINE WHALE SPOUTING: JAPAN

A SEI OR SARDINE WHALE INSPIRING (SEE PAGE 430)



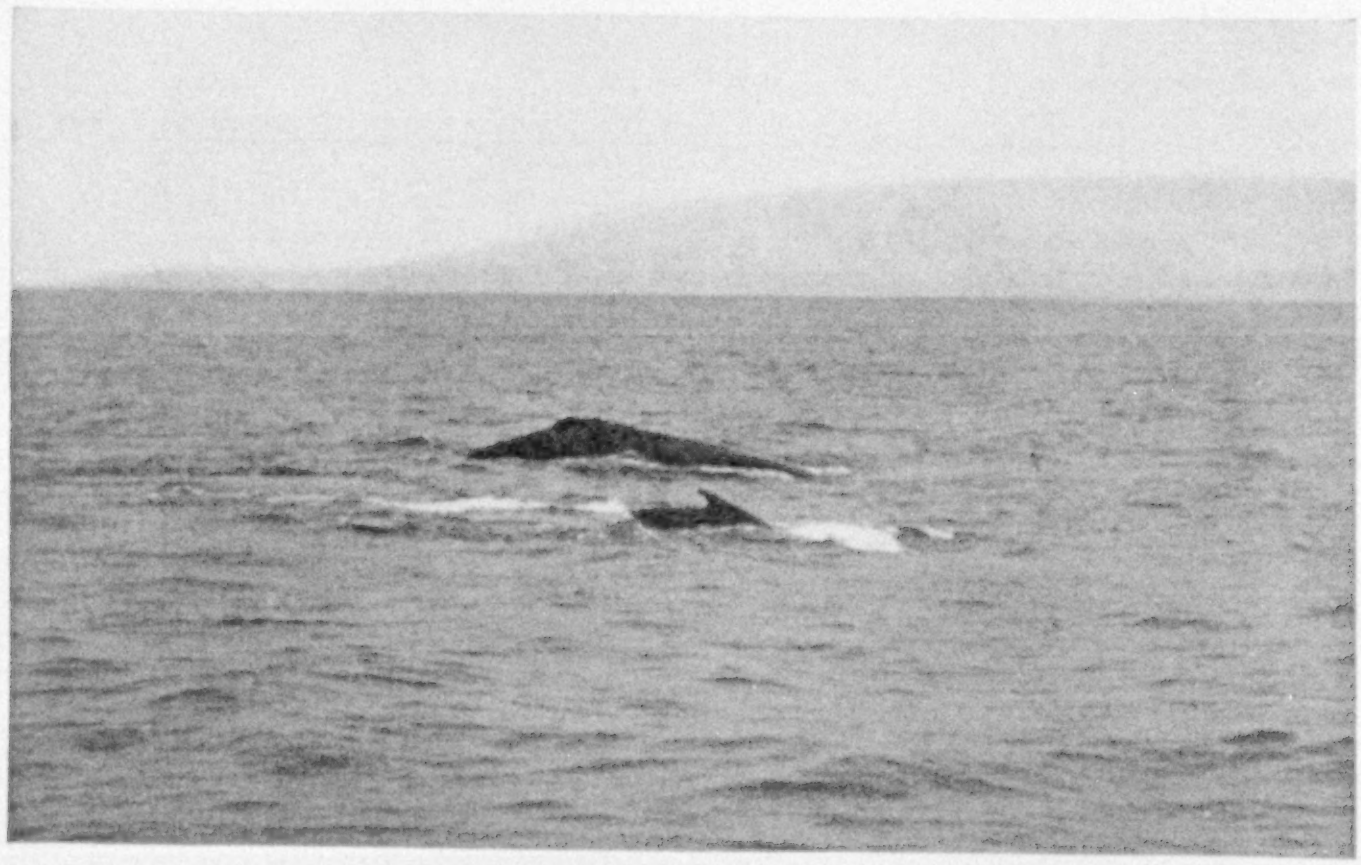
A FINBACK WHALE DIVING: JAPAN

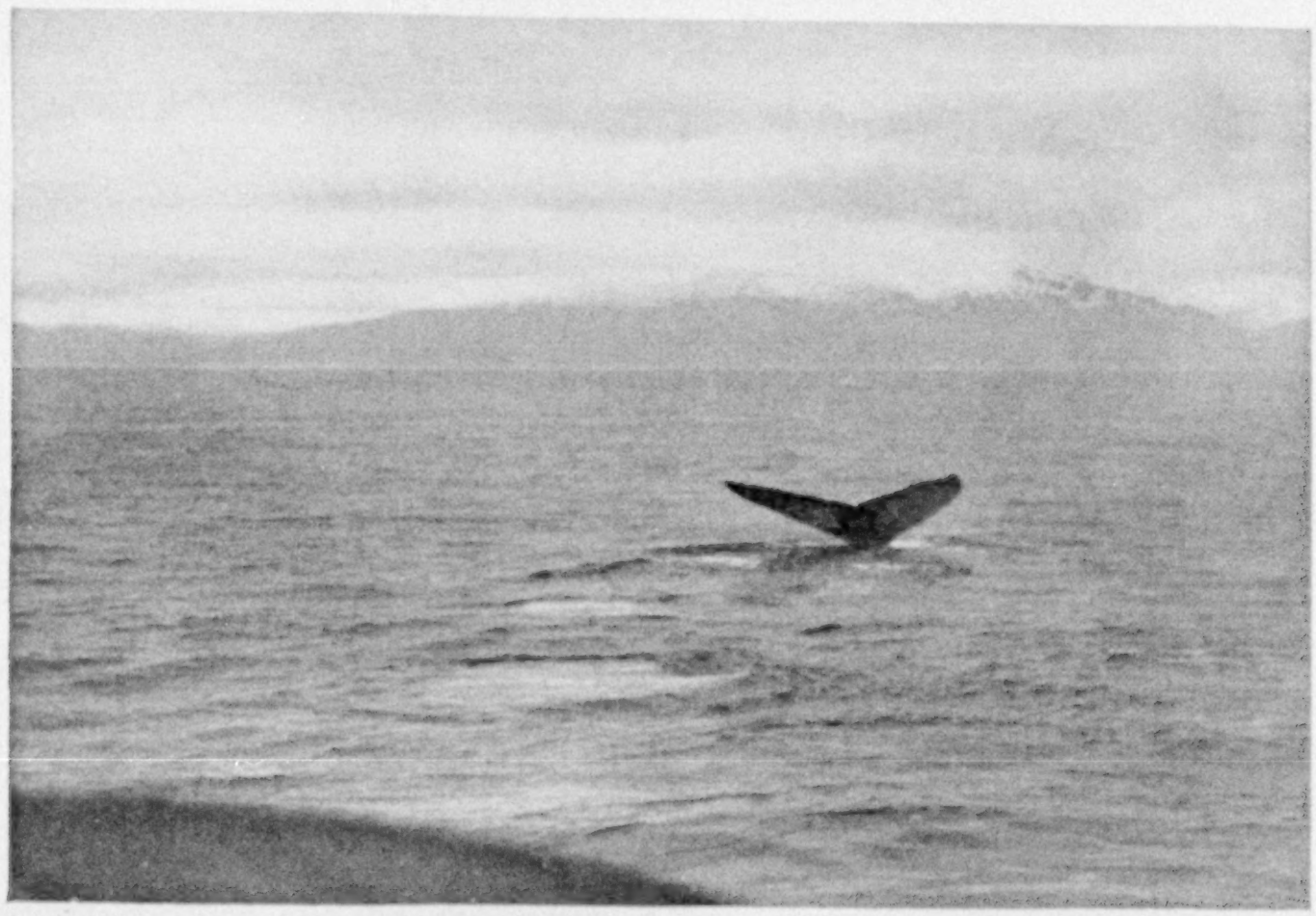
This species derives its name from the large fin on its back, and which is clearly shown in this picture



SEI WHALE ABOUT TO TAKE A "SURFACE DIVE" (SEE PAGE 430)

This species may be easily recognized in the water by the height of the dorsal fin. "It is most interesting to watch these beautiful animals pursuing a school of sardines, twisting their lithe bodies as they whirl along after the terrified, skipping fish, sometimes throwing themselves half out of the water in their eagerness. But, like the other finners, they will always eat shrimp, if it is obtainable, in preference to anything else."

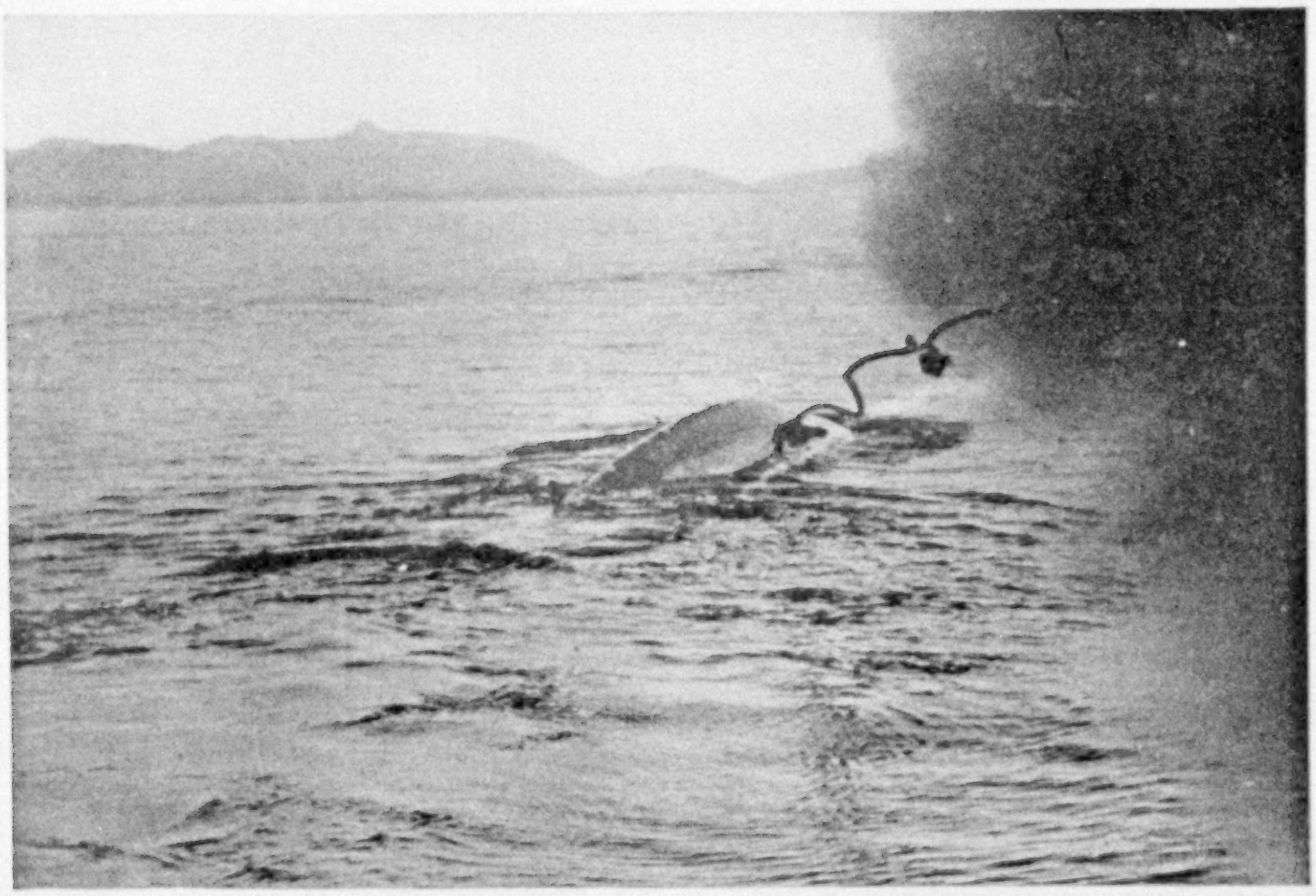




HUMPBACKS OFTEN SWIM IN PAIRS WHILE FEEDING

THE FLUKES OF A BIG HUMPBACK JUST DISAPPEARING BENEATH THE SURFACE

The smooth spot, or "slick," on the water is the invariable accompaniment of the dive.
Photos by courtesy of World's Work



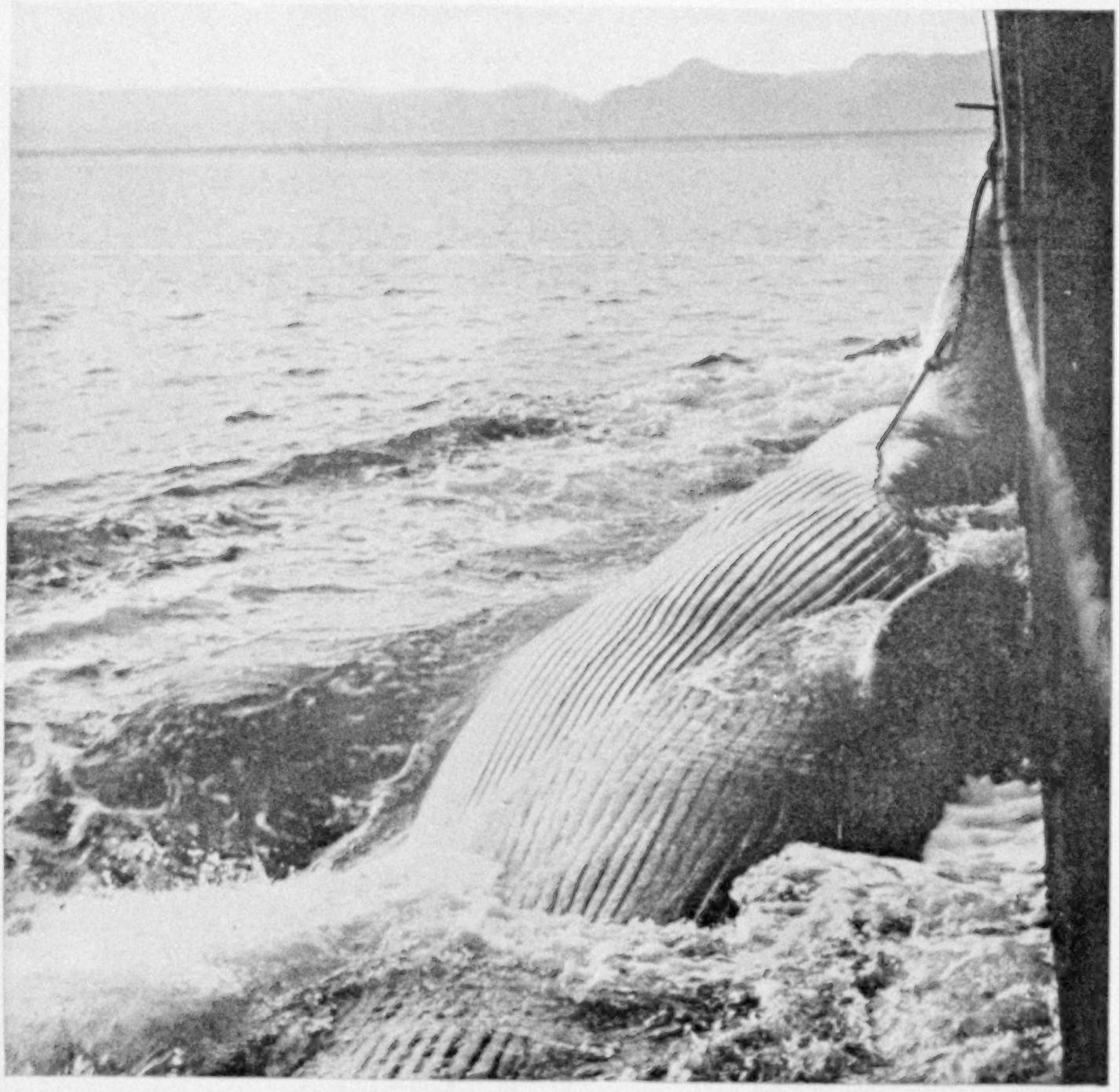
THE HARPOON AS IT STRIKES THE WHALE

In addition to the rope, the harpoon carries a bomb, which is exploded three or four feet inside the whale and usually kills the huge animal instantly. The black cloud is the smoke from the discharge.

spirit of the place was infectious, and as I splashed about in the blood and grease doing my own work, I talked and joked with the cutters in bad Japanese, causing screams of laughter when I seriously informed them that "the sun was very hot water" by the quite natural mistake of substituting the word "atsui-yu" for "atsui" (hot).

Almost every night we would be awakened by the long-drawn wail of a ship's siren whistle, bringing the news of more whales. If I did not at once stir, the little *amah* (servant), always devoted to my interests, would quietly slide back the paper screen to the sleeping-room and say, "*Andrews-sar Go Hogei wa kujira torri mashita*" (Hogei, No. 5 caught whales). When I had rolled out of the comfortable *futons* and begun to dress, I would hear little Scio-san pattering about in the other room, gathering my pencil, note-book, and tape measure. Looking like a beautiful night-moth in her bright-colored kimona, with the huge bow of her *obi* (sash) always neatly arranged, she would be there to help me into the greasy oil-skins and rubber boots, and clump along in front to the wharf, lighting the way with a "chōchin" (paper lantern) that I might not bump my head on the eaves and rafters of the low station sheds.

Every day Scio-san religiously went to her ugly little stone joss in the play-house temple on the hillside and prayed that the "America-san" might catch many whales and porpoises for the *hakubutsu-kwan* (museum) in the wonderful, fairy city across the Pacific, of which he had so often told her. And when the season was ended and she had ventured to ask the America-san to himself thank the joss, and to please her



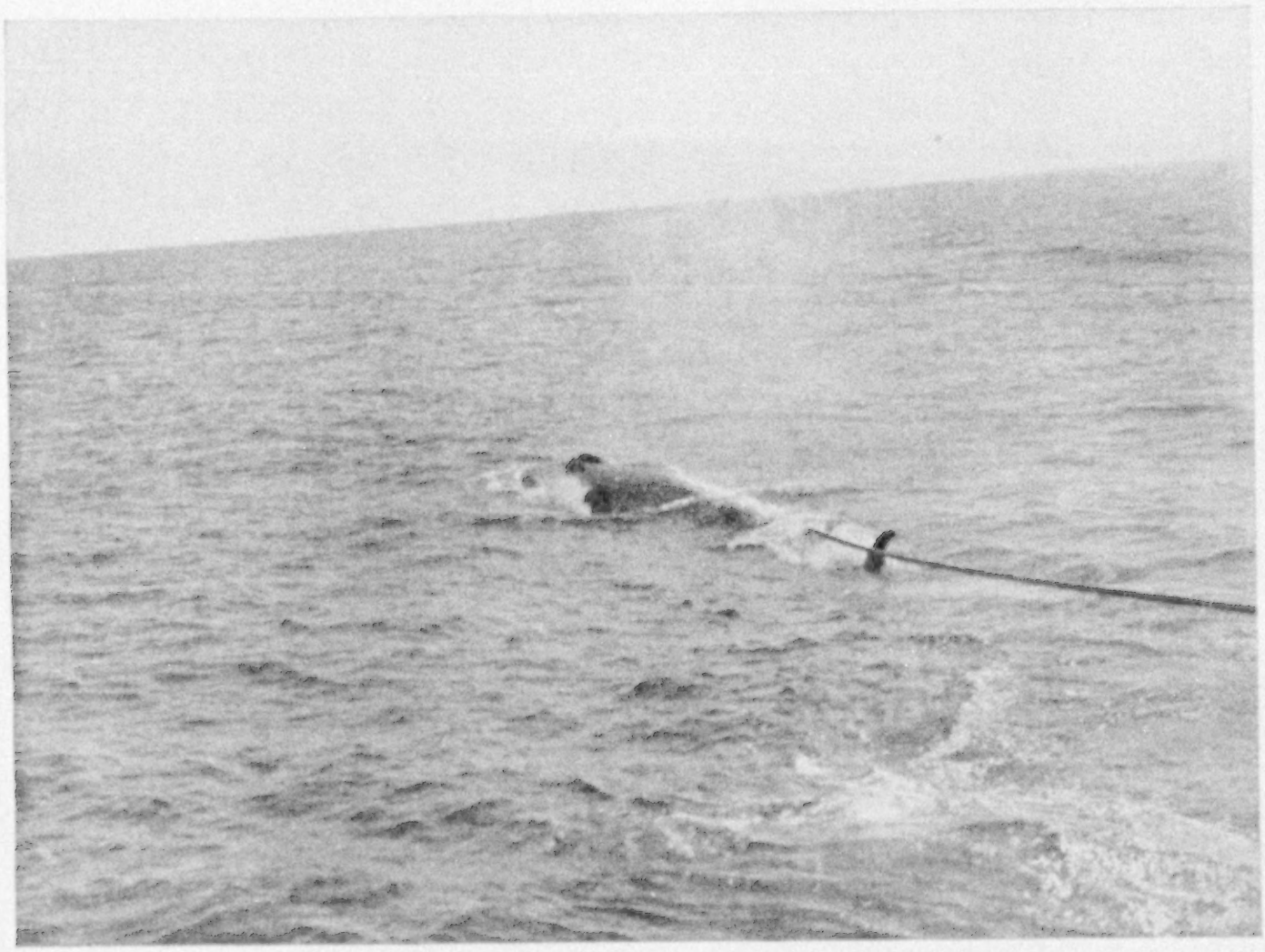
INFLATING THE CARCASS OF A HUMPBACK WHALE TO KEEP IT AFLOAT

A hollow steel tube is thrust into the whale's side and the animal is slowly filled with air by a steam pump. Photo by courtesy of World's Work

he had done so, her joy could hardly be contained, and the tip of her little nose was almost red from constant rubbing on the *tatami* (floor matting) in her bows of thanks and farewell.

Even though it was the very middle of the night when a ship's whistle sounded, long before the whale had been dropped at the wharf paper lanterns, flashing like fireflies, would begin to shine and disappear among the thatched-roofed cottages and a crowd of villagers gather at the end of the wharf. Half-naked men, child-faced geishas, and little youngsters carrying sleeping babies as large as themselves strapped to their backs, formed a curious, picturesque, ever-changing group.

Fires of coal-fat in iron racks along the wharf threw a brilliant yellow light far out over the bay filled with whale ships, heavy, square-sterned fishing boats, and sampans. The work of cutting in would go on as merrily as in the day-



TOWING THE INFLATED WHALE TO THE FACTORY

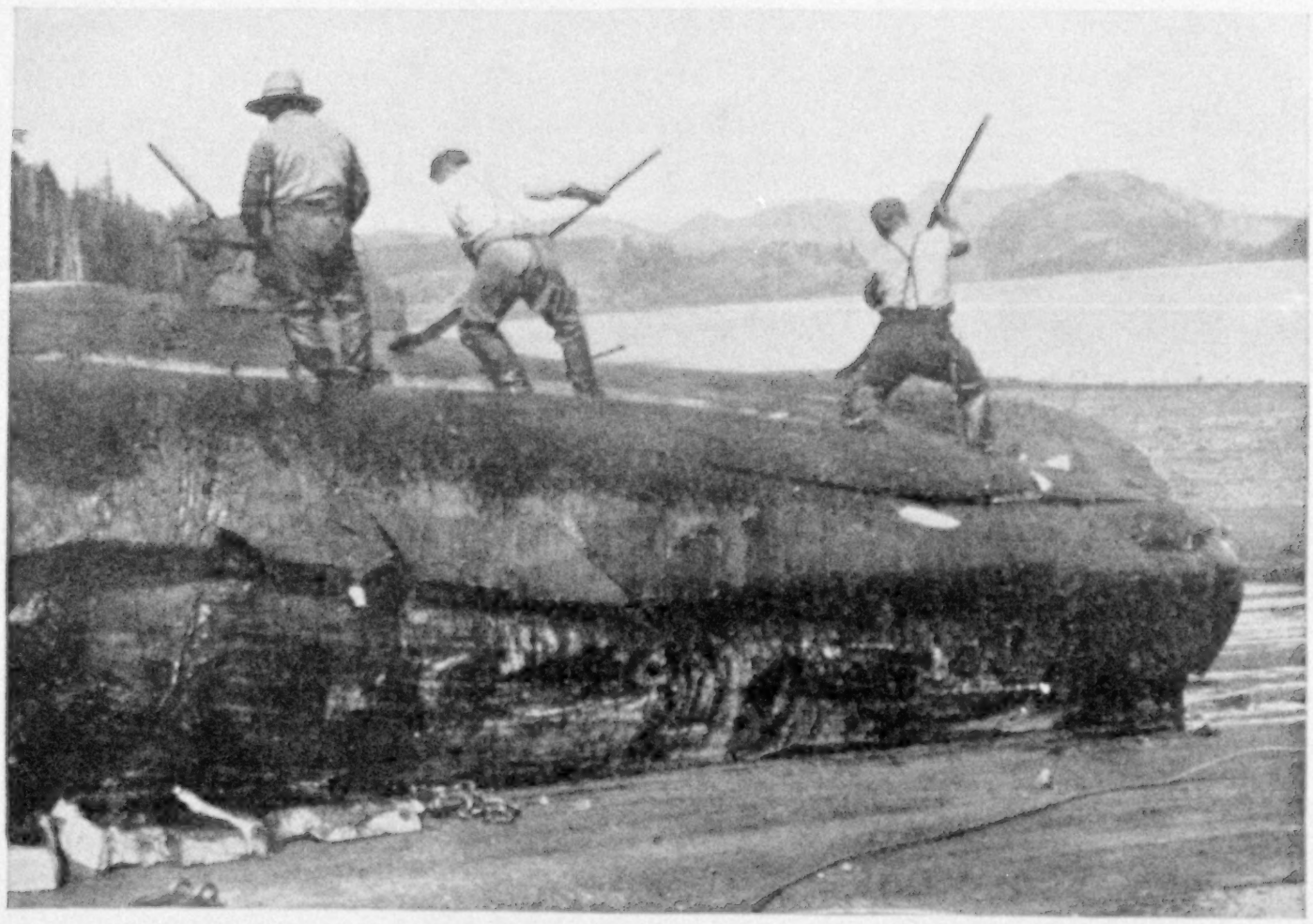
time, for the meat and blubber must be hurried on board fast transports and sent to the nearest city, to be sold in the markets and peddled from house to house.

WHALE MEAT IS VERY POPULAR IN JAPAN

Few people realize the great part which whale meat plays in the life of the ordinary Japanese. Too poor to buy beef, their diet would include little but rice, fish, and vegetables were it not for the great supply of flesh and blubber furnished by these huge water mammals. In winter the meat of the humpback whale, which is most highly esteemed, sometimes brings as much as 30 *sen* (15 cents) per pound; but this is unusual. Ordinarily it can be bought for 15 *sen* or less. But the edible portions are not only the flesh and blubber. Certain parts of the viscera are prepared for human consumption, and what remains is first tried out to extract the oil, then chipped by girls using hand-knives, and dried in the sun for fertilizer.

Whale meat is very coarse grained and tastes something like venison, but has a flavor peculiarly its own. I have eaten it for many days in succession, and found it not only palatable but healthful. The Japanese prepare it in a variety of ways, but perhaps it is most frequently chopped finely, mixed with vegetables, and eaten raw, dressed with a brown sauce.

In the summer, when it is impossible to ship the meat to any distance because of the heat, much of it is canned. The flesh is cooked in great kettles, and the cans made, packed, and labeled at the stations. On my desk as I write is a tin of whale meat which I brought from Aikawa, where hundreds of pounds were



THE FLENSERS AT WORK ON A SPERM WHALE'S HEAD: VANCOUVER

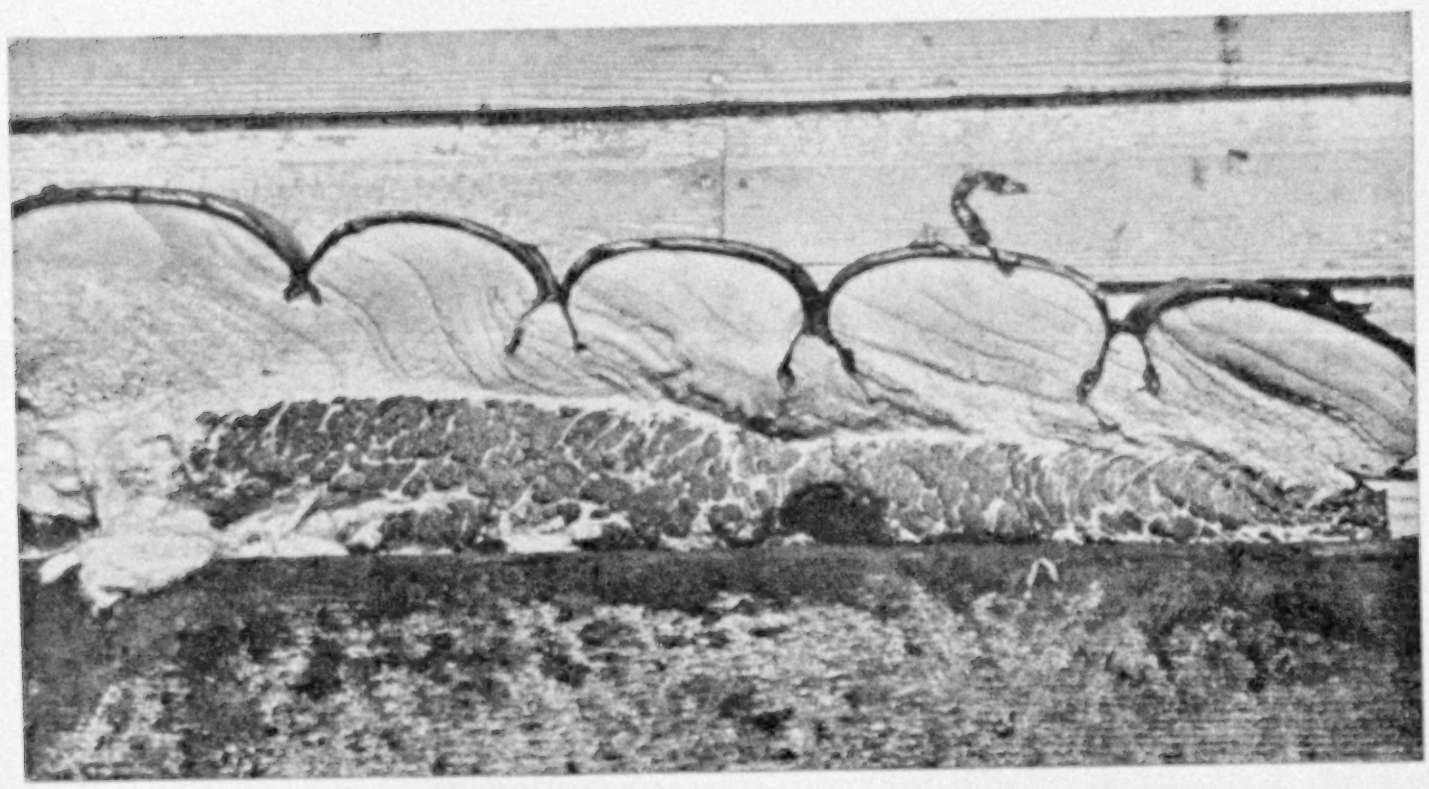
"They make longitudinal incisions through the blubber along the breast, side, and back, and from the flukes the entire length of the body to the head. The cable was then made fast to the blubber at the chin, the winch started, and the great layer of fat stripped off exactly as one would peel an orange" (see page 414).

packed and sent southward to be marketed at Tokyo and shipped to all parts of the Empire.

It is most unfortunate that prejudice prevents whale meat from being sold in Europe and America. It could not, of course, be sent fresh to the large cities; but, canned in the Japanese fashion, it is vastly superior to much of the beef and other tinned foods now on sale in our markets. In New Zealand the Messrs. Cook Brothers, who have developed a most extraordinary method of capturing humpback whales in wire nets, can a great deal of meat and ship it to the South Sea Islands, where it is sold to the natives.

The baleen of the rorquals, which is of little value in Europe and America, has been put to many uses by the Japanese. When I visited the exhibition rooms of the Toyo Hogei Kaisha, in Tokyo, I was astonished and delighted at sight of the cigar and cigarette cases, charcoal baskets, sandals, and other beautiful things created by their clever brains and skillful fingers from the material which, in the hands of western nations, seems to be useless.

The whales are going fast, and it is probable that long before the slow-moving wheels of government begin to revolve and legislation is enacted for their protection, they will have become commercially extinct. But since this seems to be unavoidable, my hopes are that the Japanese will get even more than their share while they do last. There the whales are as carefully prepared and utilized for as great a purpose as are



CROSS-SECTION OF BLUBBER ON BREAST OF WHALE, SHOWING THE FOLDS (SEE P. 414)

cattle and sheep in the Occident. In other countries but little of the real value of the animals is secured, and their great bodies are being spread upon the southern cotton fields instead of feeding thousands of hungry poor.

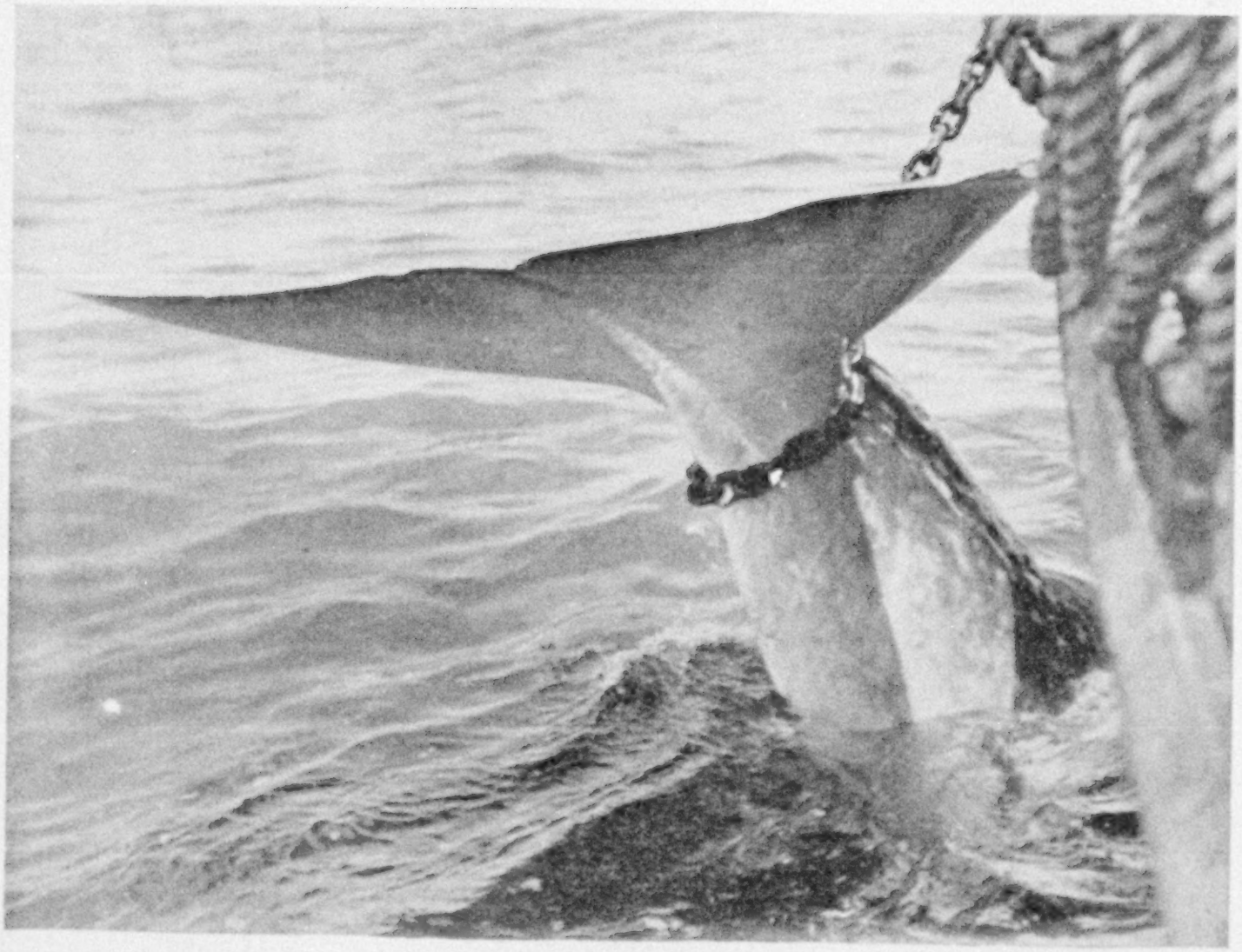
THE BLUE WHALE

I have been writing of the methods of preparing whales, but have told little of the animals themselves. Few readers, perhaps, realize that the blue, or sulphur-bottom, whale found in all our oceans is not only the largest animal that lives today, but is also, so far as is now known, the largest animal that has ever existed on the earth or in its waters. Specimens have been measured which reached a length of 87 feet and in all probability weighed as much as 75 tons. Although the mouth is enormous, large enough in fact to permit 10 or 12 men to stand upright in it, the throat measures only about 9 inches in diameter (see p. 412).

These animals, like most of the "whalebone whales," usually feed on minute crustaceans, a shrimp about three-quarters of an inch long. They probably never eat fish of any kind if other food is to be had, and of the many stomachs which I have examined, never once could anything but the little red crustaceans be found. From the stomach of one blue whale at Vancouver Island five barrels (1,215 pounds) of shrimp were taken, and it was by no means full.

The Norwegians gave the animal the name of blue whale from the bluish cast to the beautiful gray body. Sulphur-bottom, as the whale is called at the American stations, is a misnomer and unfortunate, for there is not the slightest trace of yellowish color anywhere upon the animal.

Probably no cetacean has such wonderful strength as have the blue whales. I have heard many stories of the almost incredible way in which these animals can pull, but was at first inclined to doubt them. Later, when I saw a blue whale with a harpoon between the shoulders drag the ship, with engines at full speed astern, through the water almost as though it had been a rowboat, I began to listen with more respect. Since the tail is used almost exclusively for propelling the animal forward, if the iron strikes far back the whale is greatly



MAKING A WHALE FAST TO THE SIDE OF THE SHIP: JAPAN

hampered in its swimming movements; but with the harpoon between its shoulders it can pull with all its strength.

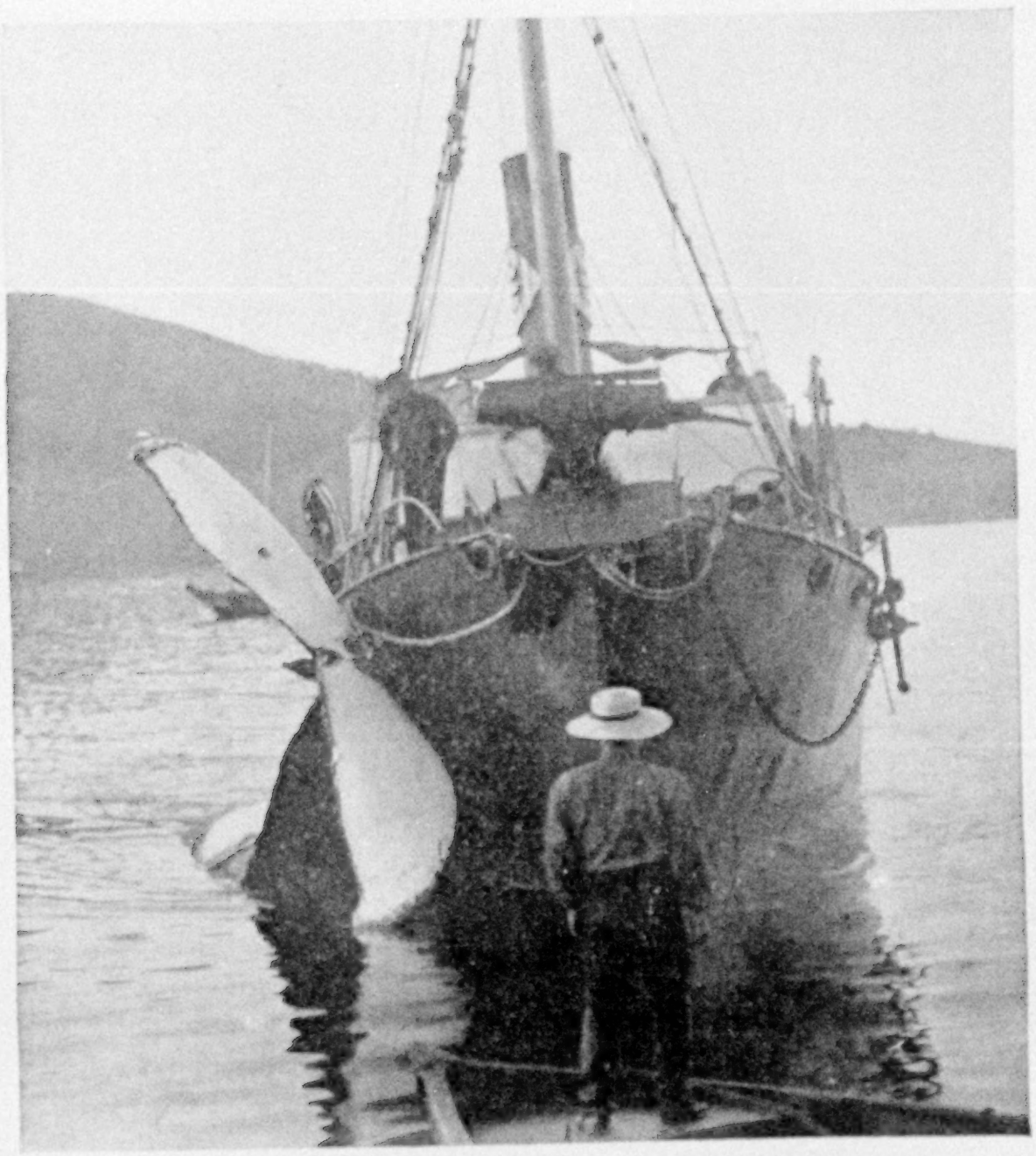
THE FINBACK, OR "GREYHOUND OF THE SEA" (SEE PAGE 437)

The finback, closely related to the blue whale, has been called the "greyhound of the sea," for its long, slender body is built on the lines of a racing yacht and the animal can equal the speed of the fastest steamship. The back is dark gray, shading into beautiful light gray on the sides and pure white below. A noticeable character about this whale is the asymetry of the throat coloring; the left side is dark slate and the right pure white like the under parts. The baleen, also, on the right side, for a distance of about 2½ feet, is white, in sharp distinction from the remaining dark places.

THE HUMPBACK IS VERY PLAYFUL

The humpback is to me the most interesting of all our large whales, partly because of the fact that its habits are more easily studied than are those of the other members of the family. Its maximum size is under 55 feet, but its body is thick and heavy, with enormous side fins, or flippers. These great paddles are one-quarter the length of the entire body and a single one from a whale 49 feet long weighed on the station scales 956 pounds. The throat, breast, flukes, and flippers of the humpback are almost invariably covered with masses of barnacles, or rather barnacles on barnacles, for the hard, shell-like *Coronula* are themselves the hosts of the soft, pendant goose barnacles (see page 417).

Barnacles are not the only parasites which infest these animals, for the hump-



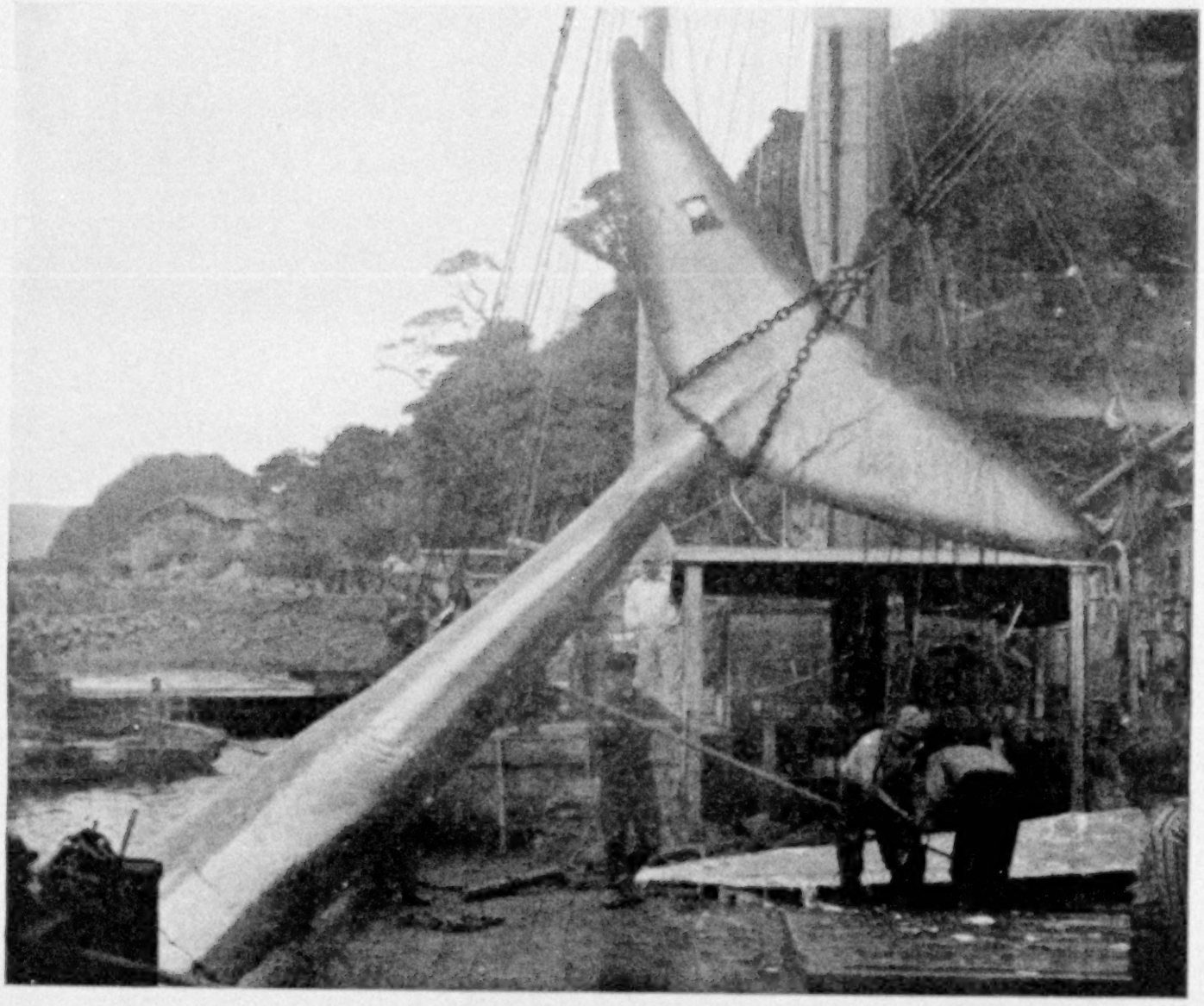
BRINGING IN A HUMPBACK: JAPAN

This is not a propeller, but the whale's tail

backs, and in fact almost all the large whales, bear numbers of crab-like crustaceans (*Cyamus*), about half an inch in length, called "whale lice." On the right whales these "lice" produce such an irritation upon the top of the snout that a large, irregular roughened patch, called the "bonnet," is formed; on the side of the lip and over the eyes are other and smaller patches infested with the troublesome crustaceans.

The most playful of all our large whales are the humpbacks, and consequently they are the most interesting to the photographer. Jumping or "breaching" is one of their most spectacular performances, and it is truly a wonderful sight. The first time I ever saw a humpback "breach" was off the Vancouver Island coast while on board the ship *Orion*. We had sighted a lone bull whale late in the afternoon, and for two hours the little ship had been hanging doggedly to the chase.

The whale seemed to know exactly the number of fathoms at which the harpoon gun was effective and gauged the distance accurately, always coming up just

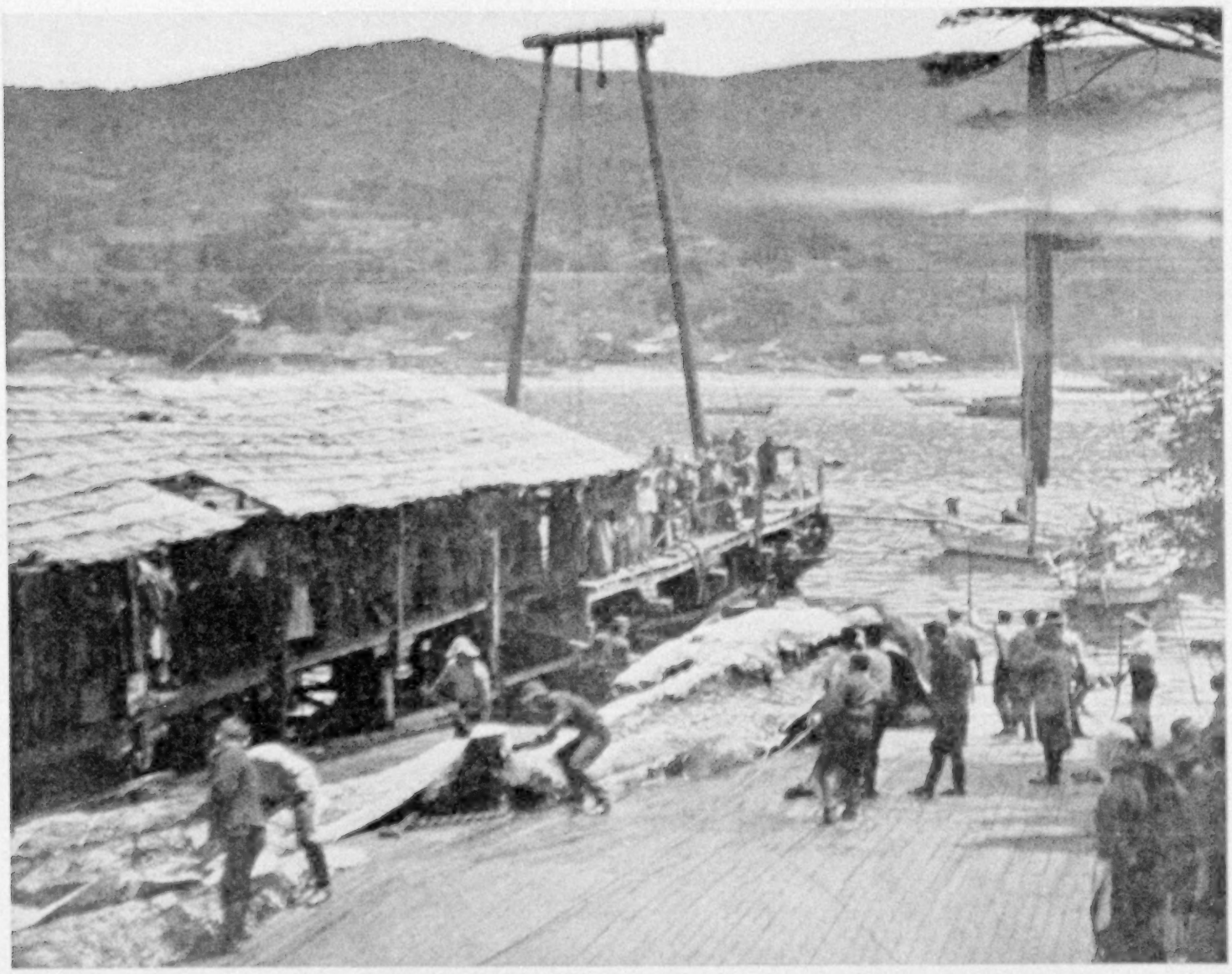


DRAWING A FINBACK UP ON THE WAYS TO BE CUT UP: JAPAN

out of range. Sometimes the animal thrust its entire head and fore part of the body out of the water, with a loud, whistling spout, sinking back out of sight before the ship could swing about. Again, it inverted itself and, with the entire posterior part out of the water, began to wave the gigantic flukes back and forth. The motion was slow and dignified at first, the flukes not touching the water on either side. Faster and faster they waved, until they were lashing the water into foam and sending clouds of spray high into the air; then slowly the action ceased and the whale sank out of sight. The ship was not far from the animal as it went down and I stood waiting on the gun platform, when suddenly the water parted directly in front of us and with a rush that sent its huge, black body five feet clear of the surface the whale shot into the air, fins extended, and fell back on its side, sinking slowly out of sight amid a perfect cloud of spray.

THE SEI, OR SARDINE WHALE

While in Japan during 1910 I had an opportunity to study in considerable detail a species which has never before been reported in numbers from the North Pacific. This is the sei whale of the Norwegians and the "Iwashi kujira" (sardine whale) of the Japanese. It is not a large animal, seldom exceeding 54 feet, and is formed on slender, graceful lines, much like the finback. Its coloration also resembles in a general way the



STRIPPING THE FLESH FROM THE SKELETON OF A GIANT FINBACK WHALE: JAPAN

latter species, but it can be readily distinguished by its high, falcate dorsal fin.

The sei whale has a habit of swimming just below the surface, sometimes with the dorsal fin exposed, and when feeding will travel for a considerable distance in this manner. It is a difficult whale to shoot, because the back is arched but slightly when the animal dives and only a comparatively small part of its body is shown above the water at one time. I have seen a sardine whale, rising almost under the bows of a ship, suddenly check its upward rush and dash along just below the surface, the vessel going at full speed beside it in order to be within range when it finally rose to spout (see pages 420 and 421).

It is most interesting to watch these beautiful animals pursuing a school of sardines, twisting their lithe bodies as they whirl along after the terrified, skipping fish, sometimes throwing themselves half out of the water in their eagerness. But, like the other finners, they will always eat shrimp, if it is obtainable, in preference to anything else.

WHALES ARE DEVOTED TO THEIR CALVES

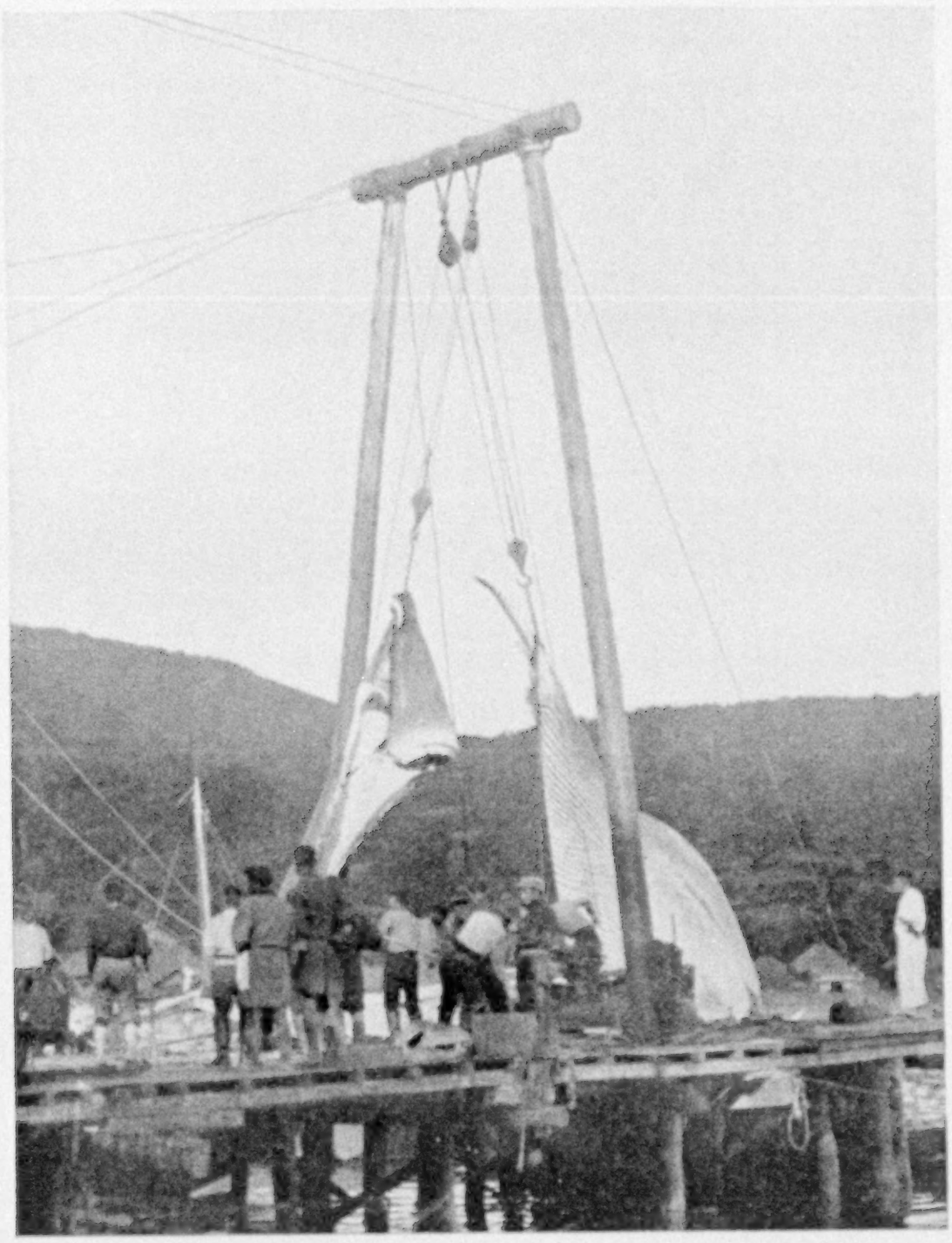
All the large whales show great affection for their young, and the cows and calves will seldom leave each other when pursued by a ship. I remember at one time in Alaska, on board the steamship *Tyee, Jr.*, we had sighted a female finback with a young one about 30 feet long beside her. They were not difficult to approach, and as the old whale rose

LIFTING A GIANT FINBACK WHALE OUT OF THE WATER SO THAT THE CUTTERS CAN GET AT IT (SEE PAGE 433)

to spout not five fathoms from the vessel's nose, the gunner fired, killing her almost instantly. The calf, although badly frightened, continued to swim in a circle about the ship, and finally, when its dead mother had been hoisted to the surface, the little fellow came alongside so close that I could have struck him with a stone. During the time that the carcass was being inflated and the gun reloaded, the calf was constantly within a few fathoms of the ship, swimming around and around, sometimes rubbing itself against the body of its dead mother. Finally a harpoon was sent crashing into its side, and it sank without a struggle.

PECULIARITIES OF WHALES

The feeding operations of the humpback, blue, and finback whales are carried on in essentially the same way and are most interesting to watch. If the "feed" happens to be floating at the surface, as is frequently the case in the morning and evening, the action can be easily seen. The whale opens its mouth, takes in a great quantity of water containing numbers of the floating shrimp, turns on its side, and brings the ponderous lower jaw upward, closing the mouth. The great, flexible tongue, filling the space between the rows of baleen, forces out the water, leaving the little shrimp, which have been strained out by the bristles on the inner side of the whalebone plates. The fin and one lobe of the flukes are thrust into the air as the mouth is closed, and sometimes the animal rolls from side to side. At this time the whales are careless of danger

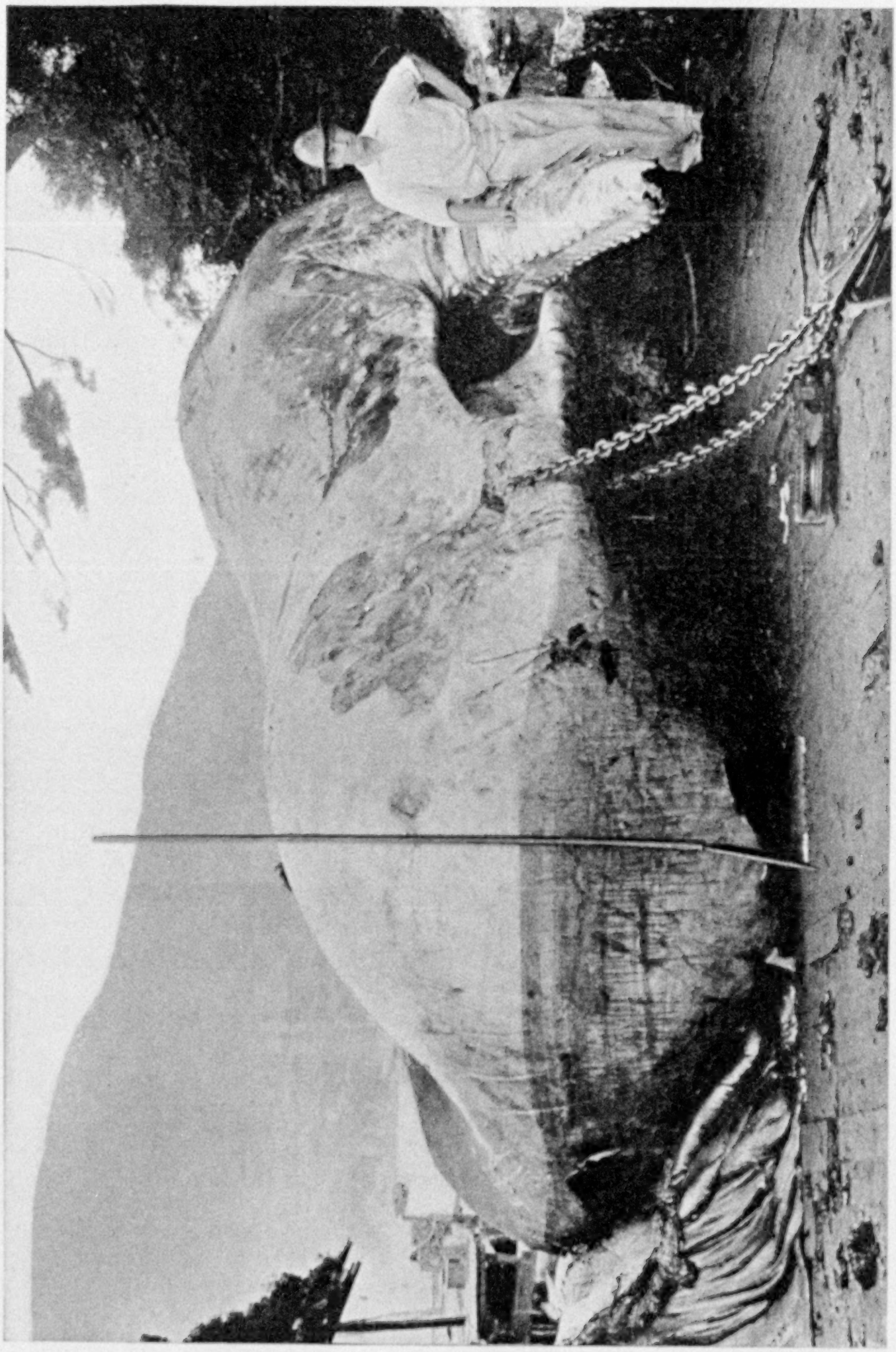


HOISTING ON THE WHARF PARTS OF THE WHALE SHOWN IN THE PRECEDING PICTURE

and pay not the slightest attention to the ship which is hunting them.

The distance traversed by whales when beneath the surface depends entirely upon circumstances. When there is little feed and the animals are constantly moving or "traveling," they may rise to spout several miles from the place of last appearance. If, on the contrary, feed is abundant, they may blow again within a short distance of the point at which they disappeared, and continue for several hours within two or three miles of the same spot.

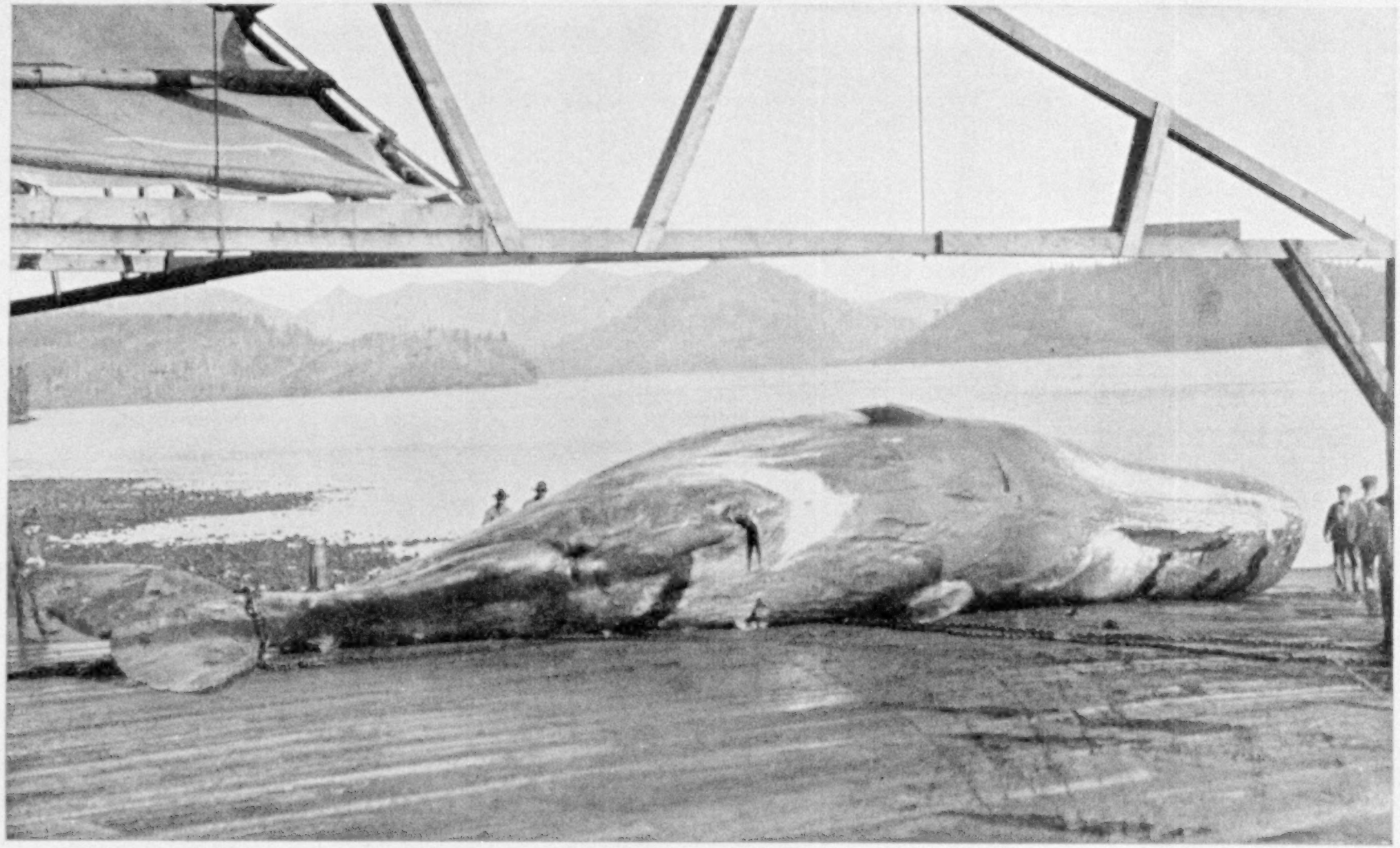
There is a belief current among fishermen that whales can remain under water for a very long time without coming to the surface. This owes its origin to the fact that whales will suddenly appear when for hours before there had been no sign of a spout, even at a distance. I believe this idea may be accounted for by the hypothesis that the animals frequently swim great distances at considerable speed without appearing to blow. The longest period of submergence for finbacks which I actually timed by my watch was 23 minutes, but



HEAD OF THE 60-FOOT SPERM WHALE SENT TO THE AMERICAN MUSEUM IN NEW YORK: THIS HEAD YIELDED 20 BARRELS OF SPERMACETI (SEE PAGE 442)

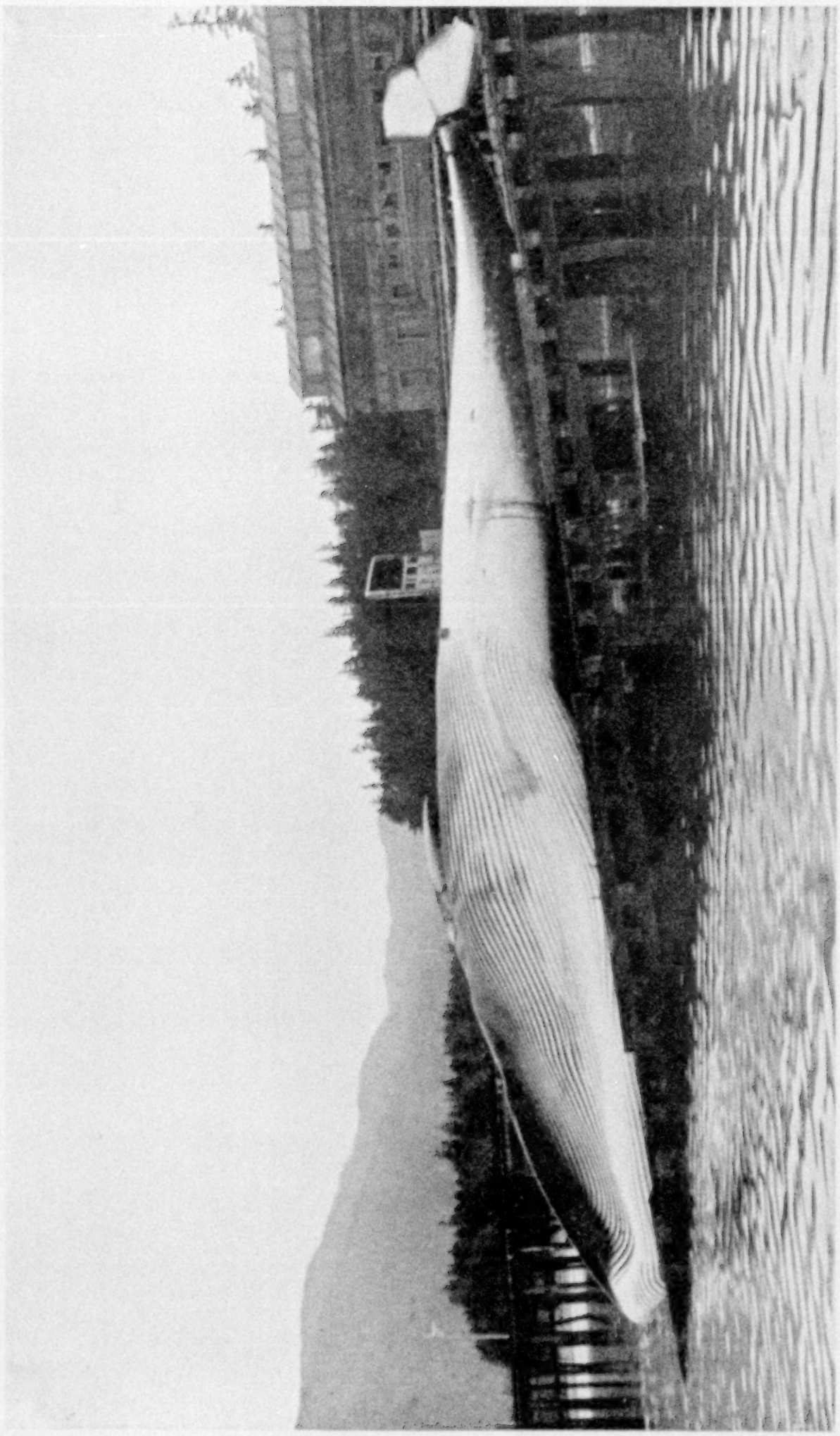
POSTERIOR PART OF A SEI OR SARDINE WHALE DRAWN UPON THE WHARF: JAPAN

This picture shows very distinctly the layer of blubber, or fat, which covers the entire body of all whales—the white layer enveloping the dark flesh (see page 414)



A BIG BULL SPERM WHALE: VANCOUVER ISLAND (SEE PAGES 434, 438, AND 439)

"The sperm whale is the animal which yields ambergris, the valuable substance used so extensively in the manufacture of our best perfumes. Ambergris is only found in 'sick' whales; that is, its presence is not normal, but is caused by a pathological condition of the intestines." Contrast the huge head and bulky frame of this species with the "racing build" of the finback whale in the next picture.



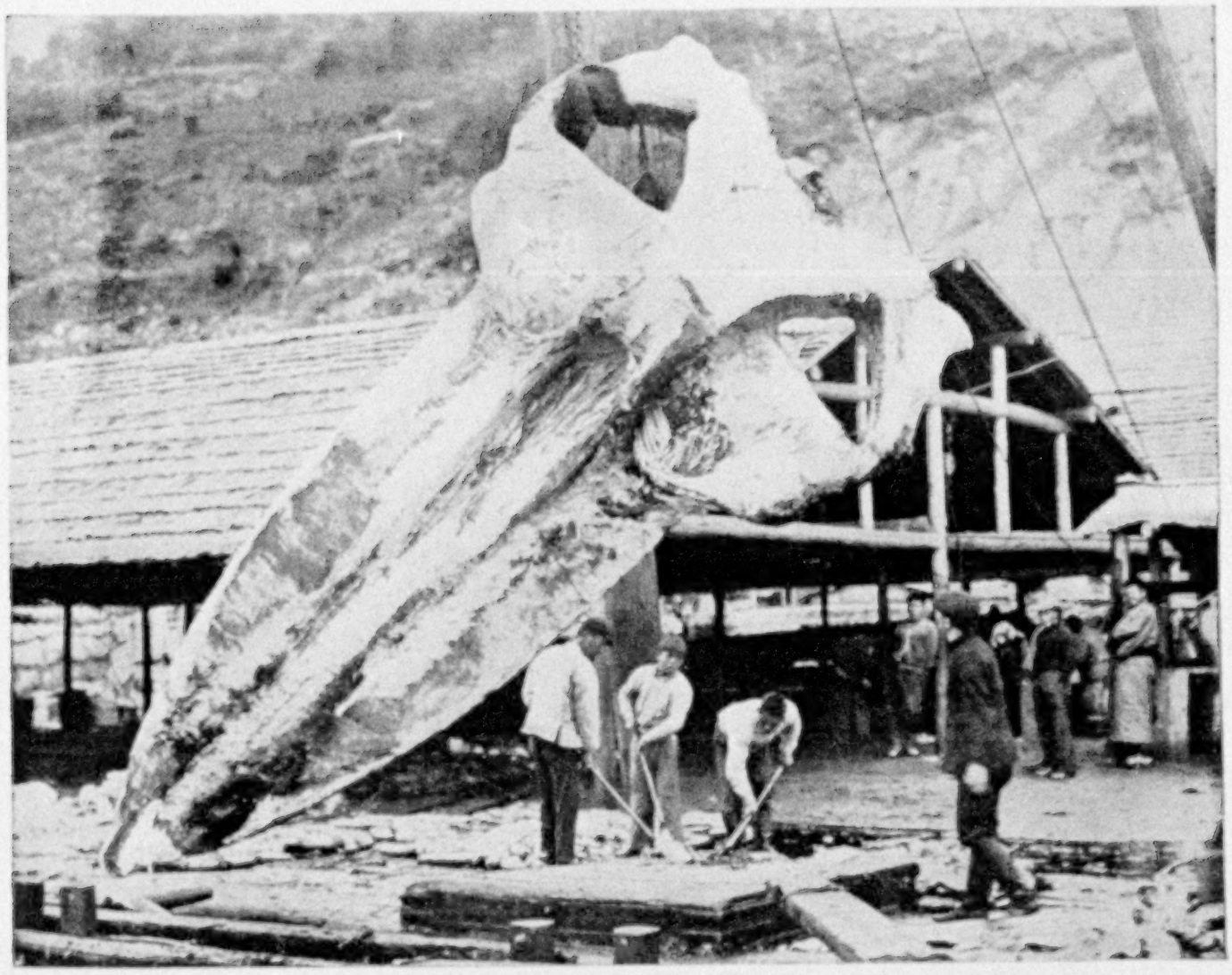
THE GREYHOUND OF THE SEA: A FEMALE FINBACK WHALE: ALASKA

"The finback, closely related to the blue whale, has been called the 'greyhound of the sea,' for its long, slender body is built on the lines of a racing yacht and the animal can equal the speed of the fastest steamship" (see page 428).

Little is known about the breeding habits of whales, except that the young of whales are born alive, and are suckled and vigorously defended by the mother, as in the case of land mammals.

CROSS-SECTION OF THE HEAD OF A SPERM WHALE

This species of whale carries two rows of 20 or 25 heavy teeth in its lower jaw. The teeth may be observed in the left portion of this picture. The teeth assist in holding the giant squid and cuttlefish, on which the enormous animal feeds. This picture also shows very clearly the layer of blubber surrounding the flesh (see pages 414 and 439).



SKULL OF A BLUE WHALE SENT TO THE AMERICAN MUSEUM OF NATURAL HISTORY FROM JAPAN

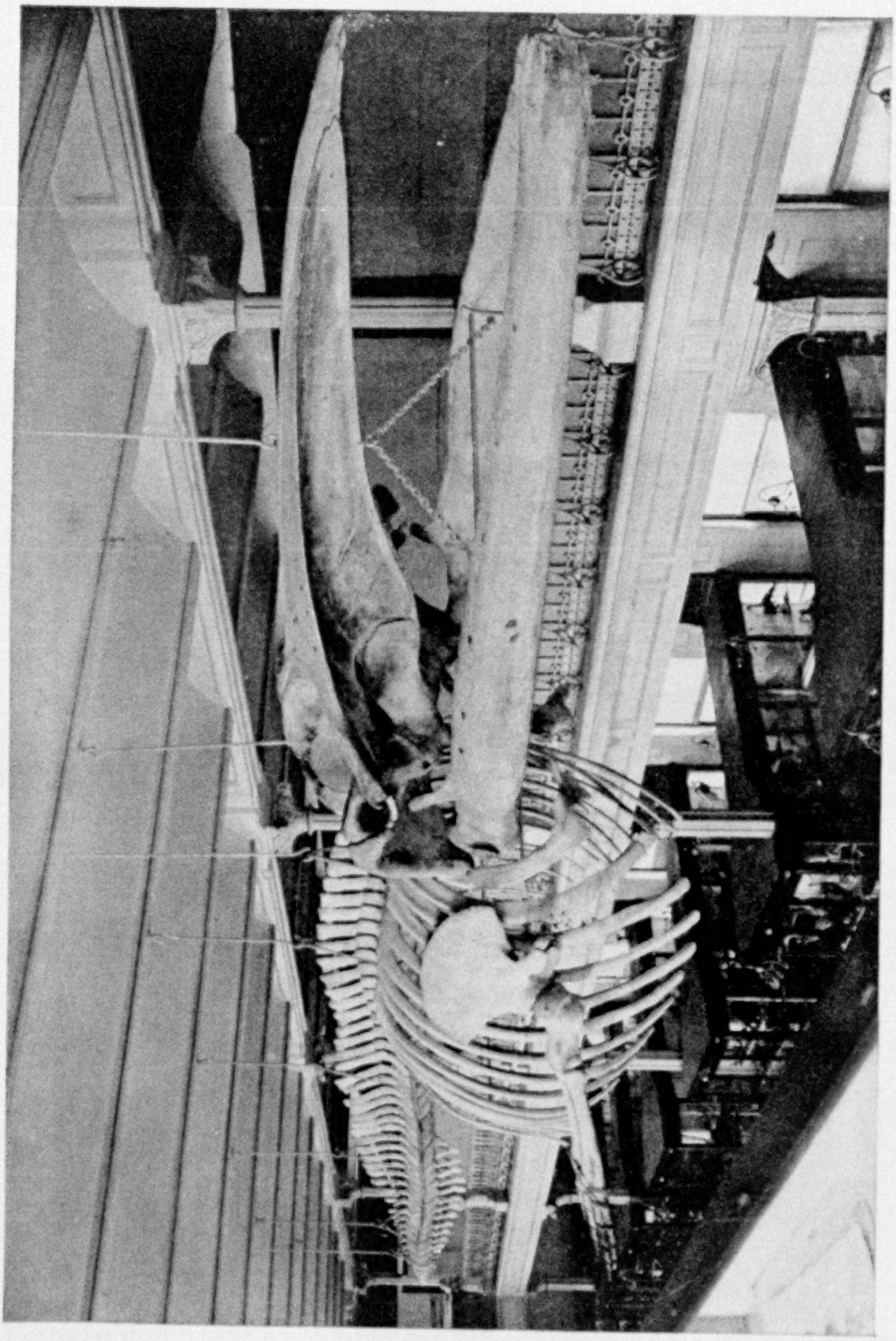
there is little doubt but that most large whales can remain under water a considerably longer time.

Both humpbacks and finbacks, when two or more individuals are together, will frequently swim side by side so closely as to almost touch each other, leaving the surface and reappearing again at exactly the same instant. Also a school, when separated by perhaps many hundred yards, will disappear as though at a given signal, double under water, and rise again a mile away, all blowing at the same time. How they communicate with each other—for it seems that they must do so—is a mystery for which I cannot even suggest an explanation.

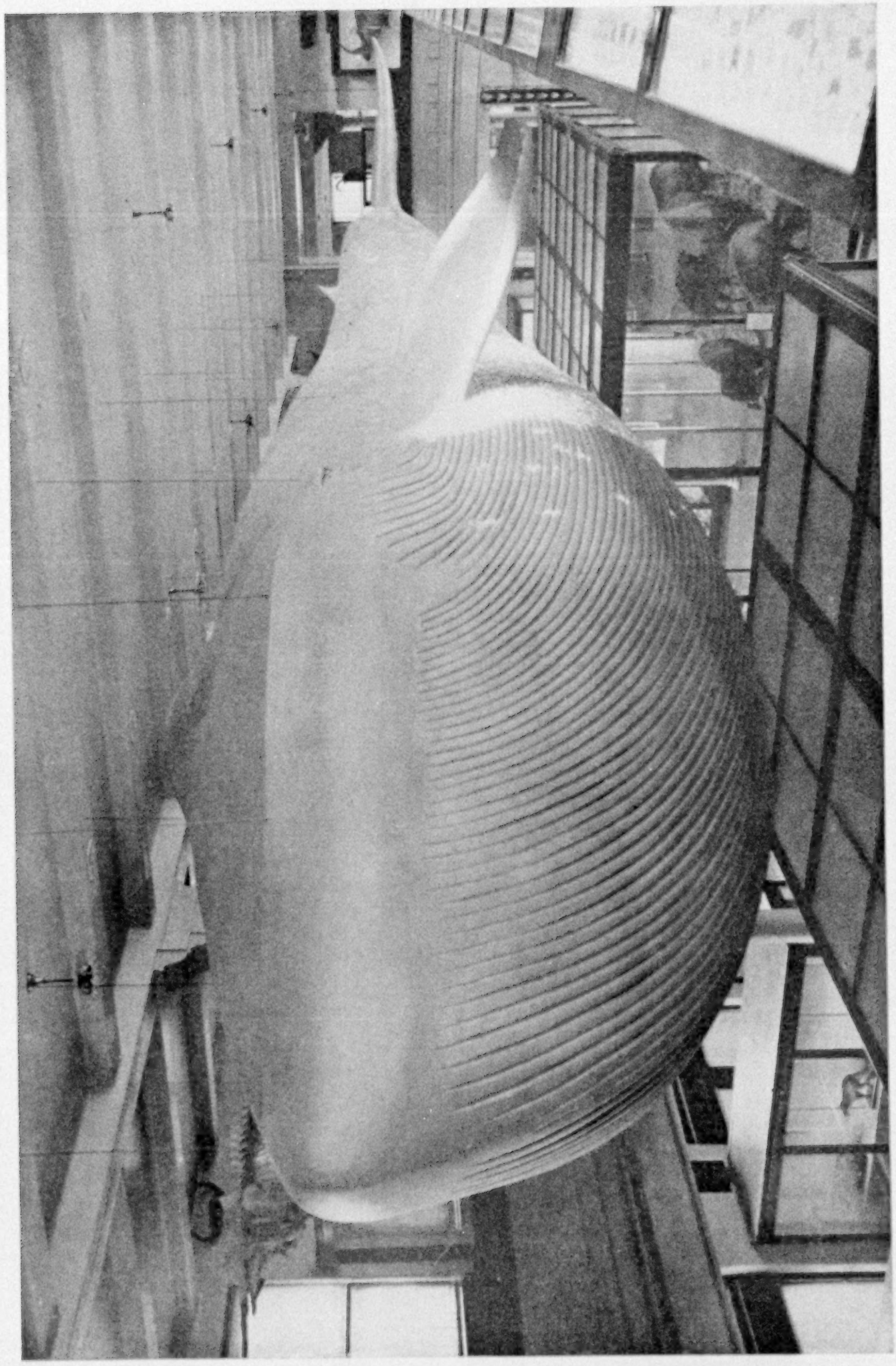
THE GIANT SPERM WHALE

No mammal which inhabits the sea is more extraordinary and grotesque in appearance than is the heavy-bodied, square-nosed sperm whale, and I suppose no mammal could furnish a more interesting study to the naturalist. At very few of the shore stations are sperms taken, but in the north of Japan, during August and September, they are killed in numbers (see pp. 434, 436, and 438).

Instead of having plates of baleen, this whale carries a row of 20 to 25 heavy teeth on each side of the lower jaw. These fit into sockets in the roof of the mouth and assist in holding the giant squid and cuttle-fish on which the enormous animal feeds. Since the squid



SKELETON OF FINBACK WHALE MOUNTED IN THE AMERICAN MUSEUM OF NATURAL HISTORY



BLUE OR SULPHUR-BOTTOM WHALE; LIFE-SIZE MODEL; LENGTH, 76 FEET

In the American Museum of Natural History; prepared under the direction of Roy C. Andrews and James L. Clark

WHALE MEAT READY TO BE SHIPPED TO THE MARKETS: JAPAN

In Japan hundreds of tons of whale meat are sold in the markets of all the large towns to people too poor to buy beef. The usual price is 7 or 8 cents per pound. One whale yields as much meat as a herd of 100 cattle (see page 425).

seldom gets far out of the warm currents, the sperm does not go into the cold water, but cruises about in the tropics and in the Gulf and Japan streams.

In the upper portion of the head the whale has an immense oil-tank in which the valuable "spermaceti" is found in a liquid condition and from which it may be dipped out with a bucket when an incision has been made. From a sperm whale 60 feet in length which was sent to the Museum from Japan, 20 barrels of spermaceti were taken out of the "case" and the surrounding fat. This oil congeals as soon as it is cooled by the air, but the natural heat of the body keeps it in a liquid condition until the case is opened.

The sperm whale is the animal which yields ambergris, the valuable substance used so extensively in the manufacture of our best perfumes. Ambergris is only found in "sick" whales; that is, its presence is not normal, but is caused by a pathological condition of the intestines. It has been found floating upon the water, and is also taken from the intestines themselves after the whale has died or has been killed. It is used as a vehicle for perfumes and not as an odor itself.

A LAND OF DROUGHT AND DESERT—LOWER CALIFORNIA

Two Thousand Miles on Horseback Through the Most Extraordinary Cacti Forests in the World

By E. W. Nelson

Of the U. S. Department of Agriculture

With Photographs by E. A. Goldman

LOWER CALIFORNIA is the long, narrow peninsula that projects about 800 miles southeasterly from the southern border of California. Its width varies from about 30 to over 100 miles, and its irregular coast-line, over 2,000 miles long, is bordered by numerous islands. Being mainly a mountainous, desert region, it is thinly peopled and presents many sharply contrasting conditions. Here low, sun-scorched plains, where death by thirst awaits the unwary traveler, lie close to the bases of towering granite peaks, belted with waving pine forests and capped in winter by gleaming snow.

Vast desolate plateaus of ragged black lava embosom gem-like valleys, where verdure-bordered streams and the spreading fronds of date palms recall the mysterious hidden vales of the "Arabian Nights." Its western coast is bathed by cool waters and abundant fogs, while the eastern shore is laved by the waves of a warm inland sea, sparkling under almost continuous sunshine.

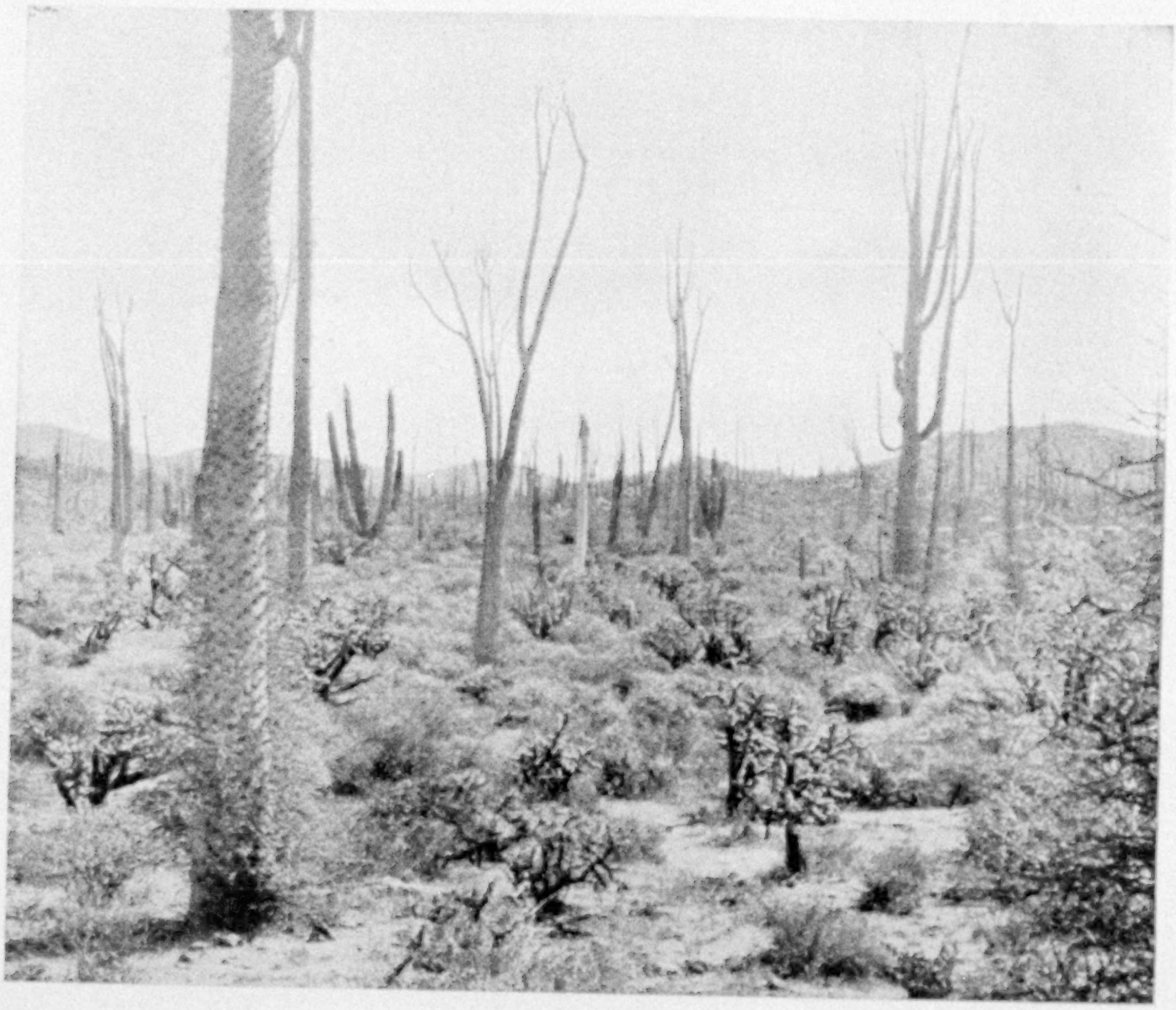
Although adjoining some of our best-known territory and with a recorded history which goes back almost four centuries and teems with varied events, the peninsula still remains one of the least-known parts of North America. The early chronicles tell of its discovery in 1533 by an expedition sent out by Cortés in search of a fabulously rich island said to have been inhabited by Amazons.

THE PATIENT WORK OF THE JESUITS

It has been estimated that at the time of its discovery the peninsula, including many of the bordering islands, was peopled by about 25,000 Indians. The inhabitants vigorously resented the intrusion of newcomers, and for more than a century efforts to establish military colonies in the new land resulted in disastrous failures. Then the occupation of Lower California was put in the hands of the Jesuits, and their missionaries were wonderfully successful. They explored all parts of the peninsula and established missions throughout most of its extent, at the same time introducing many of the crops and fruits of the old world.

In addition they established the three main trails, which extend practically the entire length of the peninsula and to this day serve as the regular routes of travel. One leads along each coast and the third down the mountainous interior. The coast trails are easier to travel, because less broken; but the middle one is most used, owing to its better grazing and more numerous water-holes. We followed this route most of the time, but at intervals changed back and forth to the others.

XUM



FOREST OF THE "CIRIO" (*Idria columnaris*), NEAR SAN FERNANDO

This tree is one of the strange desert plants peculiar to Lower California. It varies from 30 to 60 feet in height, and is covered by numberless short and extremely thorny branchlets with small leaves. The flowers are pale yellow and grow in tufts on the ends of numerous long, slender stems at the extreme tops of the trees. The bark is pale greenish yellow (see pages 449 and 461).

In the south we traversed long sections of trails which had been made passable by laboriously clearing away great quantities of broken lava, where otherwise the route would have been impracticable. These were bits of the "Camino Real," or Royal Highway, made centuries before by the Indians under direction of the early missionaries. These roads are all foot-trails, wagon roads only existing in detached stretches here and there. Two wagon roads cross the peninsula, one from Ensenada to San Felipe Bay, branching in the interior to Calexico on the California border, and another from La Paz to Todos Santos. Two others penetrate the northern part of the peninsula from the border, one down the top of the Laguna Hansen Mountains and the other along the coast from near San Diego to below San Quintin. Three or four of these roads penetrate the interior from landing places on the west coast, usually leading to some mining camp.

Today the Indians have vanished from all parts of their former territory, except a few in the extreme northern end of the peninsula. Some of the old mission churches are still in use, but most

of the missions are represented by fragments of ruined walls and choked irrigating ditches.

The records of the dangers and obstacles met and overcome by such men as Padres Salvatierra, Kino, and Ugarte in their peaceable conquest of the peninsula excite one's deepest admiration. The work they accomplished and their resourcefulness and steadfast courage entitle them to a place in the front ranks of those stout-hearted pioneer explorers who first made known the wildest parts of America.

THE HIDING-PLACE OF FREEBOOTERS

During one period in its history the southern shores of the peninsula served as the lurking place of Sir Francis Drake and other freebooters lying in wait for the treasure-laden Spanish galleons on their annual voyages from Manila to Mexico.

Afterwards, during the first two-thirds of the last century, those shores were visited by numerous half-pirate smugglers and by fleets of whalers and sealers, drawn there by the swarming abundance of whales, fur seal, sea elephants, and sea otter. So ruthless was the pursuit of these animals that in a few decades they were on the verge of extermination, and the business ended, apparently forever.

The pearl fisheries of the Gulf coast were extremely productive at first and furnished the Spanish court with some of its richest jewels. Pearl-fishing still survives as a profitable industry, and is in the hands of two or three concessionaires with headquarters at La Paz (see also page 457).

THE UNITED STATES HAVE TWICE HELD POSSESSION OF LOWER CALIFORNIA

It may be unknown to many that the United States or its citizens have twice had complete possession of Lower California. During the Mexican War, in 1847, the forces of the United States occupied the principal points in the peninsula and declared it American territory, but relinquished it at the close of hostilities. In 1853-'54 it was again captured and a government temporarily organized by bands of American filibusters under Walker. This ill-advised venture lacked support and quickly came to a disastrous end.

During the last half century all parts of the peninsula have been visited, mainly by Americans, in search of mines and other natural resources, but little of the knowledge thus gained has become available to the public. Gold, silver, copper, iron, and other minerals and much fertile land have been found, but the scarcity of water, fuel, forage, and the difficulties of transportation have united with other causes to bring about many failures in the attempts to develop these resources.

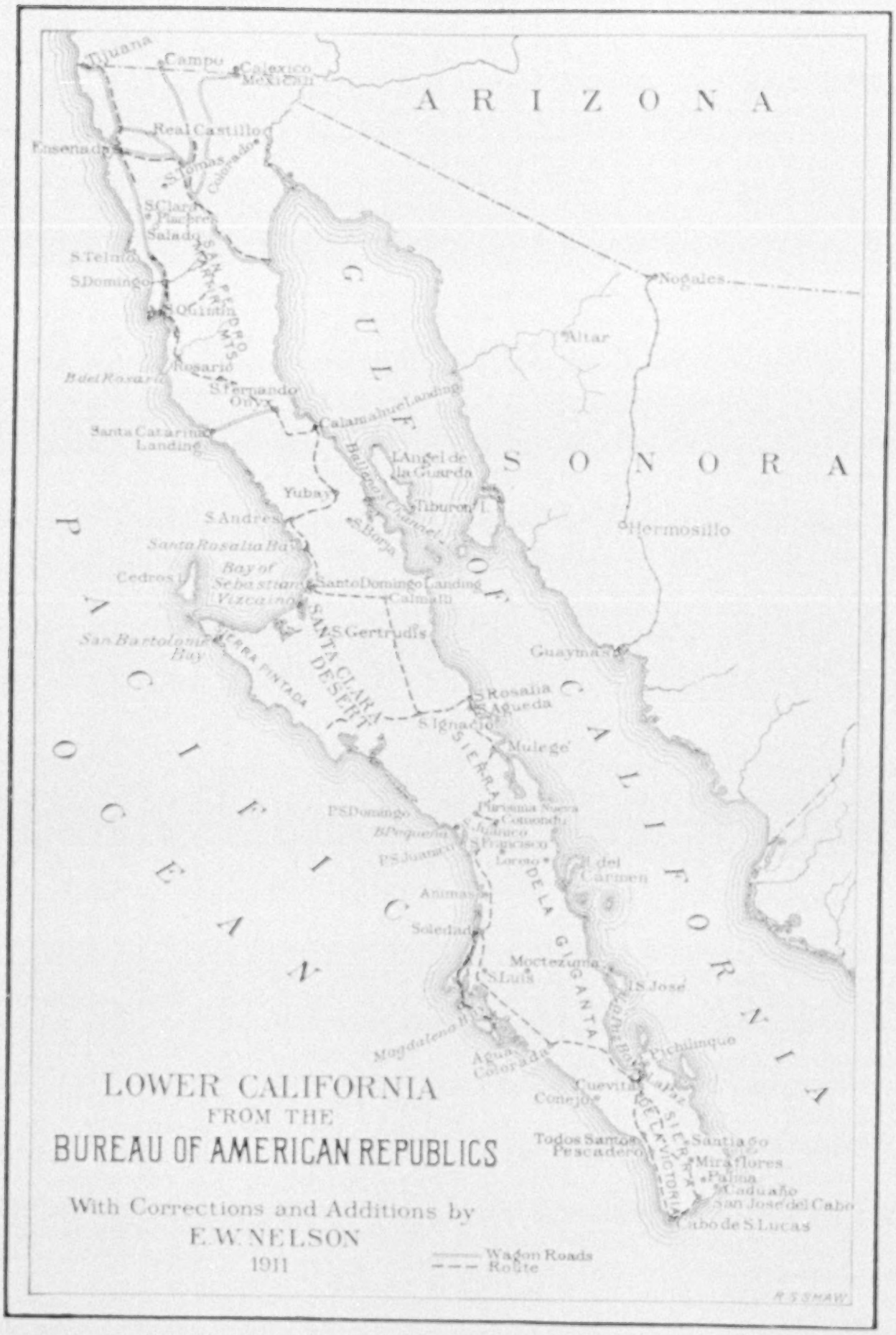
A few silver mines, notably at Triunfo, in the south, and Las Flores, on the Gulf coast, have been worked profitably. Onyx is mined and shipped to California, and enormous salt deposits exist on the shores of the Santa Clara Desert and on Carmen Island (see also page 465).

The most extensive and successful mining enterprise the peninsula has known is that of El Boleo Company, at Santa Rosalia, on the Gulf coast, where a French company has one of the largest producing copper mines in the world, which supports a town of about 8,000 people. Considerable prospecting for mines is still being done, mostly by Americans, and efforts are being made to develop mines at various points, always in the face of many serious obstacles.

Americans have made a number of attempts to establish agricultural enterprises and colonies; but, with the exception of the recent development of agricultural lands by use of water from the Colorado River, immediately south of the border, opposite the Imperial Valley, California, these efforts have been almost uniformly unsuccessful.

TWO THOUSAND MILES ON HORSEBACK IN THE DESERT

In connection with our work, a preliminary boat expedition was made by



OUTLINE MAP OF LOWER CALIFORNIA, SHOWING ROUTE OF AUTHOR, E. W. NELSON

Mr. Goldman with Dr. D. T. MacDougal, of the Carnegie Institution, to the delta of the Colorado in March and April, when the flood-plain of the Hardy River, at the base of the Cocopah Mountains, was covered with water.

In May we proceeded to Ensenada, a small port on the west coast of the peninsula, about 75 miles south of San Diego, to outfit for our long journey. This place is at the head of a small bay, with the steep slopes of the coast mountains rising a short distance inland. Some years ago Ensenada had a temporary "boom" while efforts were being made to establish an agricultural colony there. At the time of our visit the town was more deserted than usual, owing to the number of people who had gone to seek employment on the irrigation works of Imperial Valley. This town is the main port of the northern part of the peninsula as well as the capital of the northern district. Lower California has a territorial form of government, and, owing to its great length, is divided near the middle into a northern and a southern district, Ensenada and La Paz being the capitals of their respective districts.

The governor of the northern district, Colonel Celso Vega, received us courteously and did everything in his power to forward the object of our visit. After some delay we secured the services of two Mexicans, who claimed to know the trails and water-holes along our intended route, with four saddle-horses and four pack-mules. Many of our self-constituted advisers predicted a sad ending to our journey, comforting us with the assurance that we should have secured saddle-mules in place of horses, for the latter would never carry us half way across the desert. It is no doubt true that mules are better fitted for desert work, but our horses, with a single exception, made the entire journey.

During the next 10 months we traversed the entire length of the peninsula and crossed it eight times from shore to shore, traveling on horseback a distance of more than 2,000 miles, in addition to several boat trips to islands offshore.

THE COUNTRY IS MAINLY MOUNTAINOUS

Lower California is mainly mountainous, with irregular plains, mainly along the Pacific coast, and smaller plains and valleys here and there along the Gulf coast and in the more elevated interior. In climatic and other physical features the northern third of the peninsula is a continuation of extreme southern California, with local modifications. In the east the southern end of the Colorado Desert crosses the border and continues down the Gulf coast to San Felipe Bay, but is more broken by desert mountains than on the Californian side of the line. The part of the desert lying immediately south of the Californian border, with Mexicali as its chief town, is already being improved by irrigation from the Colorado, and will share with the adjacent Imperial Valley of California in extensive agricultural development from this source.

Along the Pacific side a low range of coast mountains rise from 1,000 to 4,000 feet a short distance inland and extend over 100 miles southerly from the border. Back of this range lie a series of narrow valleys, beyond which rises the main interior mountain range, forming the backbone of the peninsula. These mountains constitute a high, narrow range over 150 miles long extending southeasterly from the California border. The southern section of this range, forming the San Pedro Martir Mountains, rises from 6,000 to over 10,000 feet above the sea and has a rugged and broken crest with bench-like valleys.

These are the highest and most picturesque mountains in the peninsula. From their bold summits one has a superb view across the Colorado Desert, with its barren ranges far below appearing like the ridges on a relief map. To the northeast a distant silvery line marks the course of the Colorado, while to the east one's vision crosses the shining waters of the Gulf of California to mountain ranges in the far interior of Sonora. The San Pedro Martir range bears a striking resemblance, on a smaller scale,

to the southern part of the Sierra Nevada in the Mount Whitney section.

This range is composed of pale gray granite, and has a gradual slope through series of foothills to the west and a precipitous escarpment 3,000 to 8,000 feet high fronting the desert on the east.

The only pine forest in Lower California occupies the top of these mountains and extends almost the entire length of the range. It forms a narrow belt of rather scrubby yellow pines, with many Murray pines and a few sugar pines and incense cedars on the San Pedro Martir Mountains. At present this timber is of little value, while the growth is so widely scattered and difficult of access that much of it will always remain of no economic value. From the southern end of San Pedro Martir Mountains the main mountains of the peninsula continue as a lower, broader, and much more broken chain, made up of detached ridges, spurs, and occasional isolated peaks. These mountains lie almost wholly in the eastern half of the peninsula and often form a precipitous shoreline, sometimes for long distances along the Gulf.

Lower scattered ranges and foothills sometimes border the Pacific coast, but coastal plains extend for hundreds of miles along that shore. From the northern border southerly to near La Paz the general elevated interior backbone is continuous, but at this point the mountains descend to a broad, low plain, which extends across the peninsula from shore to shore and isolates the mountains of the extreme southern end from those of the north.

The mountains from La Paz north to the middle of the peninsula are chiefly volcanic. On the Gulf side these volcanic ranges have an abrupt slope; on the westerly side they form great lava-covered, sloping plateaus, broken by crater cones and scored and gashed by huge ragged canyons from 1,000 to 3,000 feet deep. This volcanic region contains some of the wildest and most desolate scenery imaginable, in the midst of which are set oases which include the most beautiful inhabited places in the peninsula (see pages 456-459).

AN UNSUCCESSFUL COLONY

Three extended desert plains border the Pacific coast and are separated by low coastal mountains. The smallest and most northerly of these plains lies about San Quintin Bay and contains much fertile land and considerable water at moderate depth, although there is little on the surface. An unsuccessful attempt was made to colonize these lands on a large scale at the same time the effort already referred to was made at Ensenada. A large flour-mill was built at the head of San Quintin Bay, to grind the wheat the colonists were to grow, and a railroad started and built a few miles northward on its way to San Diego, where it was to carry the product of the mill! The little village of San Quintin, now consisting of a customs-house, a store, and a few dwelling-houses back from a small wharf, is the supply point for American prospectors and miners working among the barren mountains of this region.

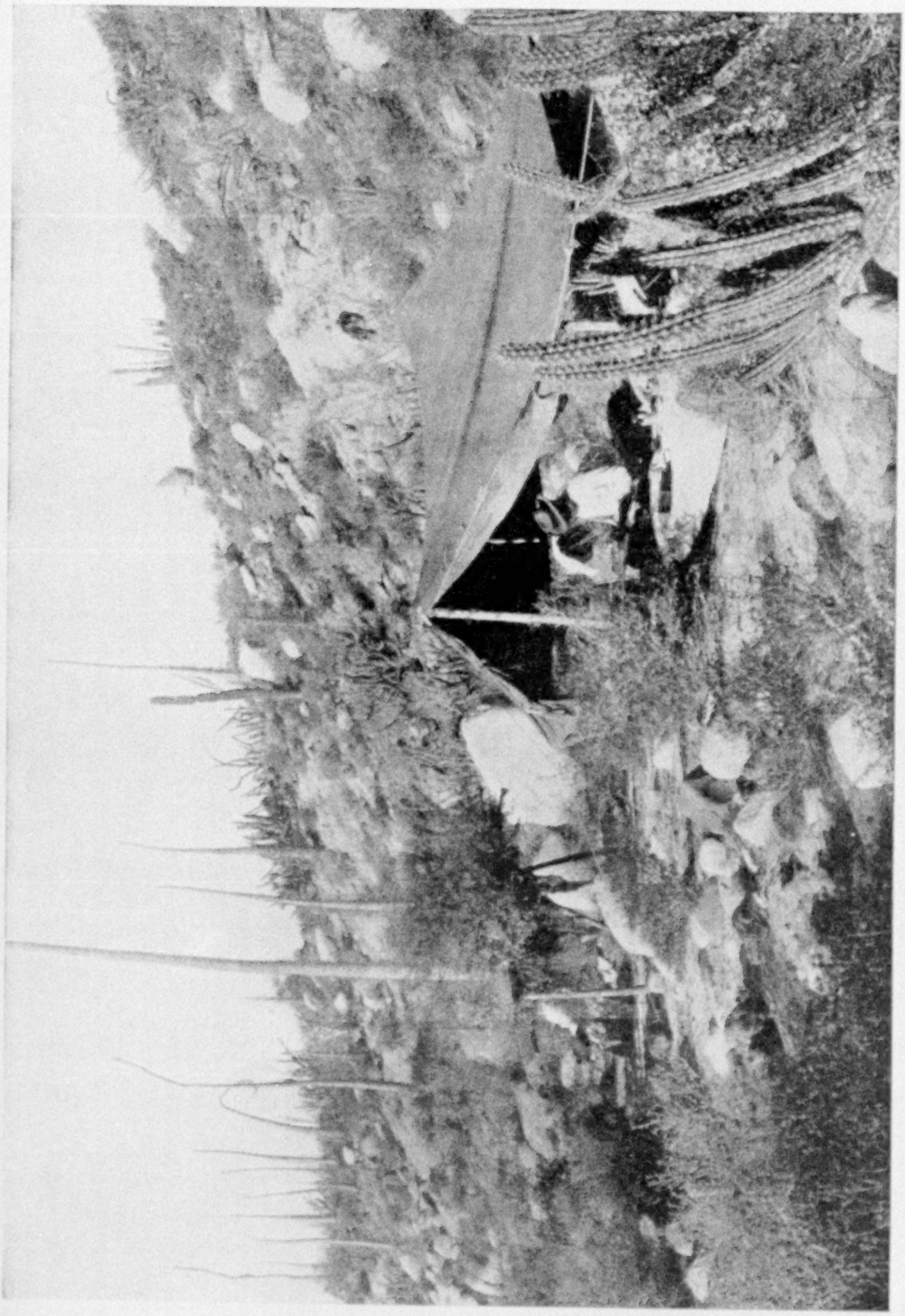
From a few miles south of San Quintin to Santa Rosalia Bay the west coast is hilly. South of the last-named bay a great plain, the largest on the peninsula, comes in and extends for over 150 miles southward and from 40 to 50 miles inland. This is the Santa Clara Desert, which became known to many adventurous prospectors when the Santa Clara "dry placers" were discovered. These placers are on the seaward slope of the Santa Clara range, which borders the coast southeasterly from Cape San Eugenio, and their discovery led to a rush in 1900, but the scarcity of water on this inhospitable desert soon caused them to be abandoned. Santo Domingo Bay, on the northern border of this desert, is the landing place for supplies for the small mining camps of Calmalli and Campo Aleman, to which a good wagon road leads straight away into the interior.

A NOTED BREEDING RESORT FOR WHALES

A little further south lies Scammon Lagoon, once a noted breeding resort for

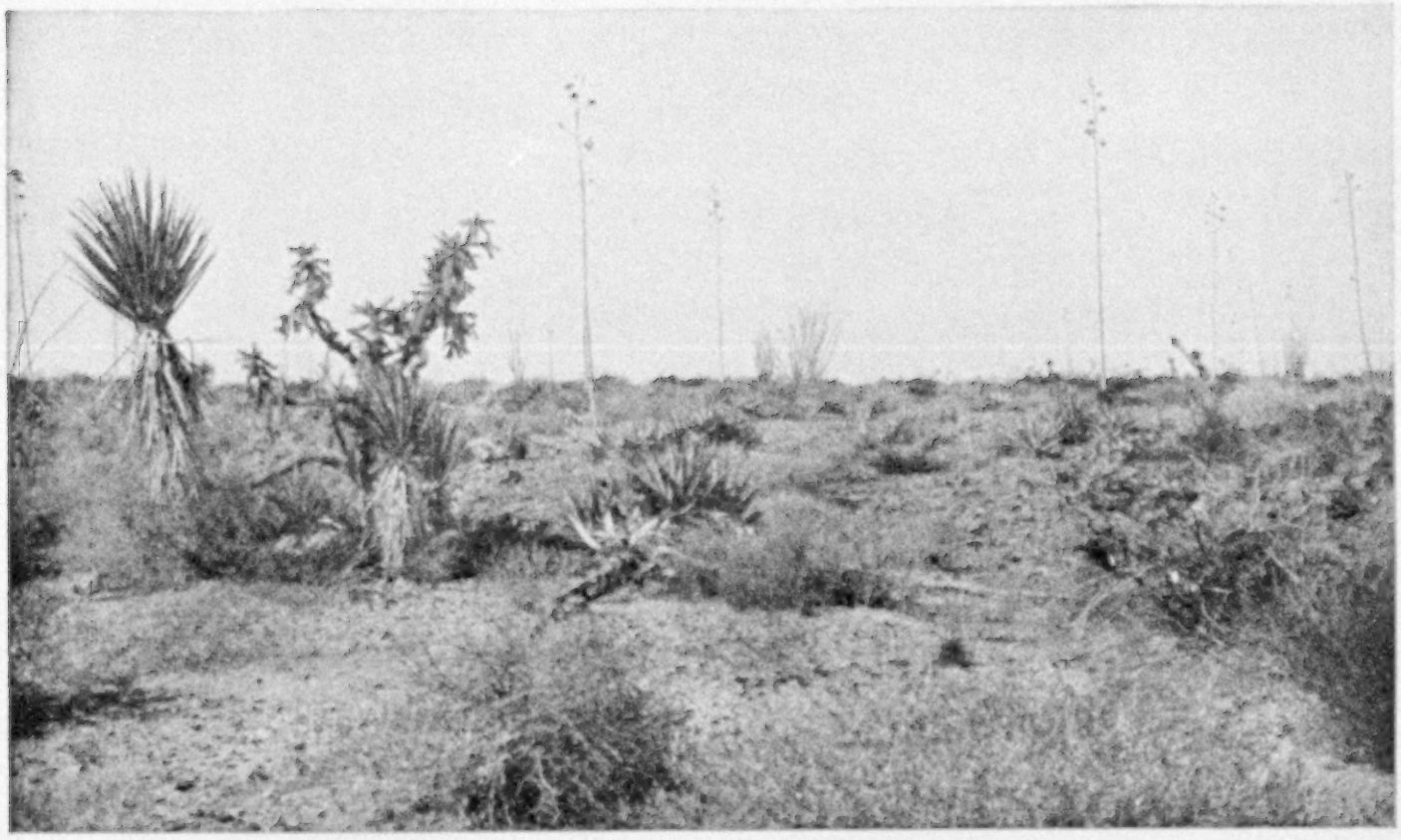
THE OLD MISSION TRAIL OF THE INTERIOR, LEADING THROUGH A FOREST OF DESERT PLANTS NEAR SAN FERNANDO

This trail, as were all the main trails in Lower California, was made by the Jesuits two or three centuries ago. The pole-like trees are the "cirio" (*Idria columnaris*); the many-branched shrub on the left is an "ocotilla" (*Fouquiera splendens*), which bears a brush-like mass of brilliant red flowers at the tips of the stalks. Small oval leaves grow along the stems.



A DESERT CAMP AT THE WATER-HOLE OF YUBAY

In the right foreground and elsewhere are many of the rough-stemmed cactus, *Lemaireocereus gummosus*, among the tall stems of the *Idria columnaris* and *Pachycereus pringlei*



PLAIN OF SAN AUGUSTIN

A sterile district, where small agaves are numerous, with a few yuccas, Fouquieras, and several species of small cactuses. The tall "poles" are the flower stalks of the *Agave shawii*.

whales, which animals suffered the usual fate of their kind and were killed or driven away by the whalers. All of this coast from Cape San Eugenio to Ensenada once abounded with whales, sea elephants, fur seal, and sea otter. One of the first missionaries who visited the coast near Cape San Eugenio speaks of the abundance of the sea otter and the ease with which his Indian companions killed them. These animals were still plentiful in 1809, when the American smuggling and trading ship *Dromio* visited Ensenada and bartered with the natives for 1,700 sea-otter skins.

At the extreme head of Scammon Lagoon, in the Santa Clara Desert, is an enormous deposit of rock-salt, and a similar deposit exists on the southern end of this desert, near Ballenas Bay. Water is so scarce on this plain and there are so many rainless seasons that there is little prospect for any agricultural development (see pages 445 and 465).

South of the Santa Clara Desert the hills again border the coast for a few miles and then give way to the Magdalena Plains. This is another low coastal area which extends southeasterly along shore to Magdalena Bay and beyond, a distance of more than 200 miles. It varies from 10 to 30 miles in width and contains a large amount of fertile land, though surface water is extremely scanty. Water exists at moderate depth in many places, and one artesian well is flowing near the northern end of the plains.

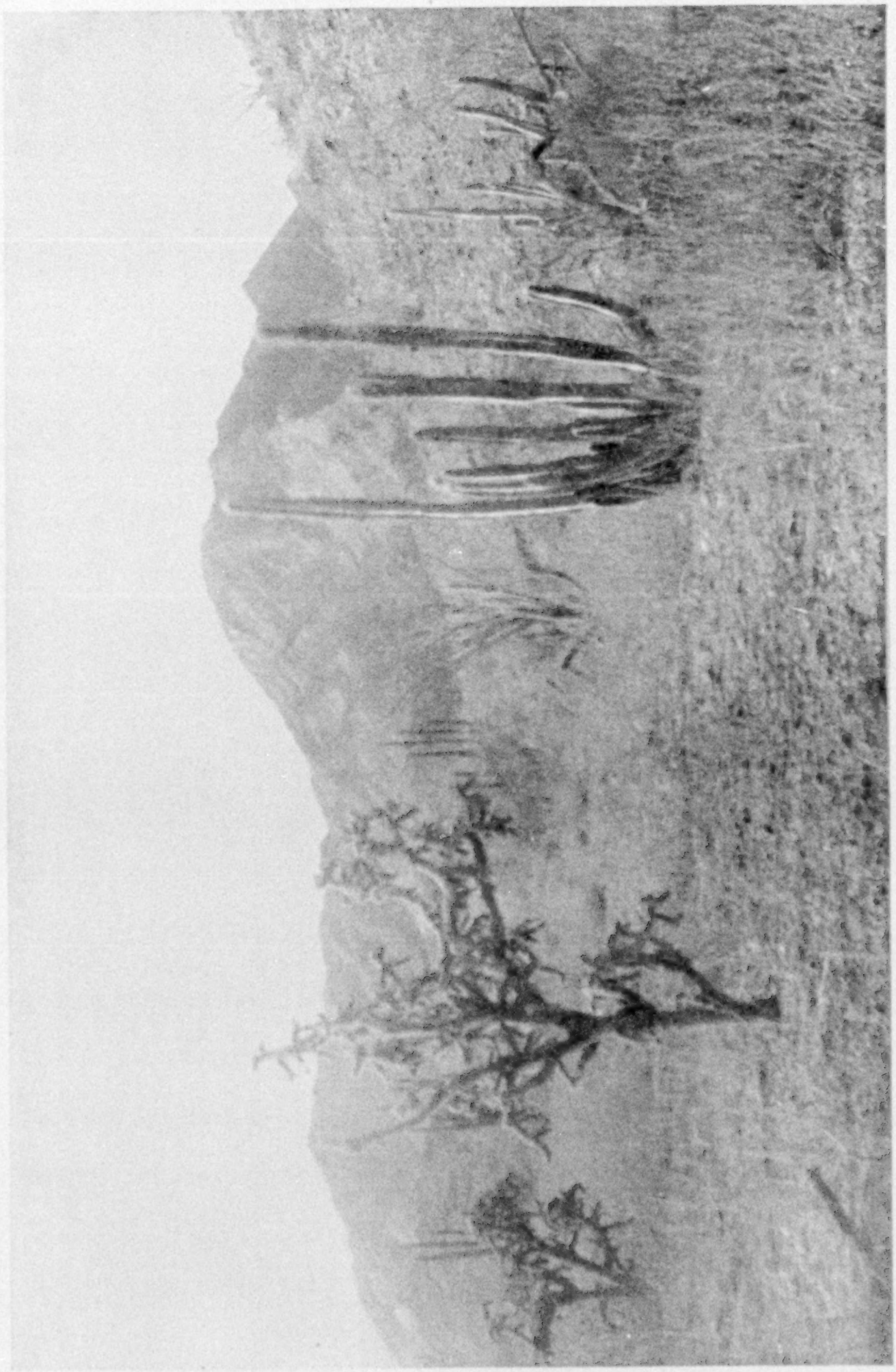
THE AMERICAN ATTEMPTS TO COLONIZE MAGDALENA BAY UNSUCCESSFUL

In 1870 an American colonization company, owning a large concession of land on Magdalena Plain, made an attempt to establish a colony on an open area known as the Llano de Yrais, bordering Magdalena Bay. In common with all other attempts to colonize the peninsula, this effort was a complete failure and was soon abandoned.

It was discovered, however, that the *orchilla*, a lichen resembling Spanish moss and growing abundantly on the

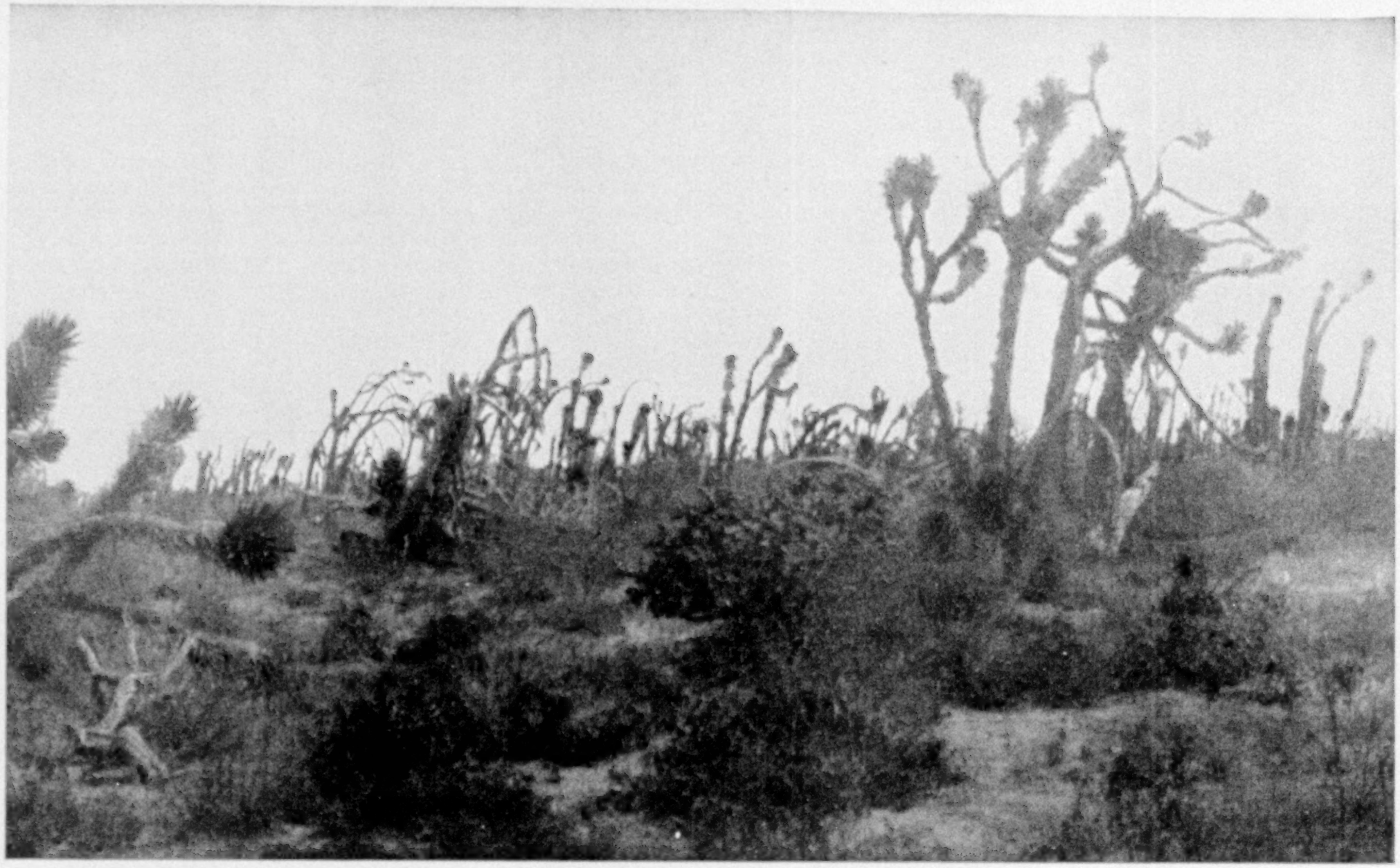
DESERT VEGETATION AT THE ARROYO DE CATAVIÑA SOUTHEASTERLY FROM SAN FERNANDO

For hundreds of miles down the elevated interior the country is covered with combinations of strange plant forms so fantastic in appearance that they might belong to some remote geological age, rather than to present time. In the left foreground is a *Fouquiera splendens*, behind which rise the pole-like *Idria columnaris* and the giant cactus *Pachycereus pringlei;* on the right are many beautiful palms (*Neowashingtonia*), marking the course of an underground flow of water (see page 463).



TYPES OF VEGETATION IN CALAMAHUE VALLEY, ON THE EXTREMELY HOT AND ARID GULF COAST

The peculiar tree on the left is a branching cactus, of a species of opuntia



A FOREST OF YUCCAS (*Yucca valida*)

This forest of many miles in extent covers the plain immediately inland from Santo Domingo landing, on the road to Calmalli. Owing to the strong and persistent northwest winds which prevail for months on this coast, the tops of many of these yuccas become permanently bent away from the course of the wind. The fixed position of these bent tops gives one the impression that a strong wind must be blowing, even when it is calm.

desert shrubs and small trees on this plain, was valuable for dyeing purposes. The firm of Flores, Hale & Co. secured a concession of a great tract of land, built warehouses on Magdalena Island, and established a flourishing industry in gathering this plant and shipping it to Europe. Eventually the discovery of chemically produced dyes destroyed the market for *orchilla*, and the possessions of the original company have passed into the hands of "The Chartered Company of Lower California," an American corporation, which owns a belt of land about 15 miles wide along the coast from 23° 30′ to 29° north latitude, covering an area of about 4,000,000 acres. This company has fine headquarters on Magdalena Island and many cattle on the neighboring plains, from which they supply fresh beef to vessels which visit the bay. Their headquarter cattle-ranch is at Soledad, 50 miles north of the bay. We were hospitably entertained at both places by the resident manager, Mr. W. J. Heney.

MAGDALENA BAY IS AN IDEAL HARBOR

Magdalena Bay is a beautiful land-locked harbor, with the narrow entrance guarded by the headlands of high, mountainous ridges extending back some distance on Magdalena and Margarita islands. The bay is about 15 miles across, with low, sandy shores on the eastern or mainland side and to the north and northwest. Magdalena village is on the western side of the bay, on the island of the same name, at the head of Man-o'-War Cove, a fine, sheltered nook formed by a curve in the mountainous shore, a few miles inside the entrance to the bay.

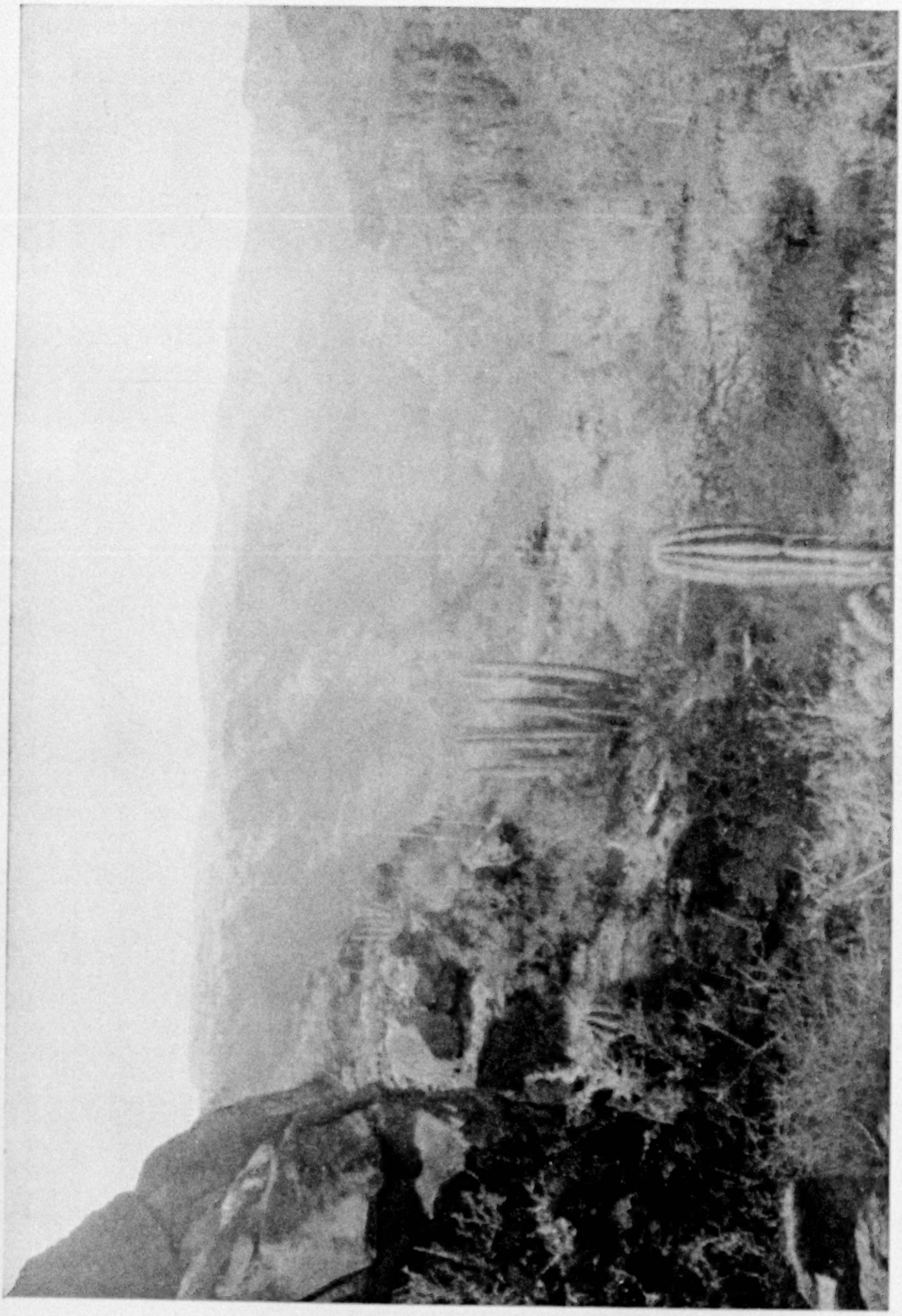
The absolute shelter within this bay and its delightful, sunny winter climate has for years made it a favorite winter practice ground for our Pacific fleet. On some flat land half a mile from the village on Magdalena Island are some low breastworks where the sailors formerly practiced shore-drill, but I was told this had been stopped, owing to protests from the Mexicans.

While we were at Magdalena the German training ship *Falke* came in and spent several days at both day and night practice. The activity of the night practice on one occasion gave us an uncomfortable half hour when we were crossing the bay in a small sloop. We were about half way across when the searchlights played over the water and firing began at target rafts, apparently too near our direction for comfort. However, we must have been seen, for the firing quickly ceased until we were well out of line. The officers and crew were a fine lot of men, and I was much interested to note the keen desire of the commander for information of every kind concerning the country we had traversed.

OUR PRESENT COALING STATION IN LOWER CALIFORNIA IS NOT COMPARABLE TO MAGDALENA BAY

The sailing route of steamers up and down the Pacific coast, whether to Mexican ports or to Panama, passes within sight of the entrance to Magdalena Bay, thus making it an ideal point for a coaling station. For many years the United States has had a naval coaling station in Lower California, located at Pichilinque, on the easterly side of La Paz Bay. This station is on the shore of an open bay in the Gulf of California and can be reached only by leaving the regular line of travel down the Pacific coast, rounding the southern end of the peninsula, and steaming up the Gulf a distance of over 200 miles off the route to Panama. An exchange of location of this station from its present site to Magdalena Bay would add greatly to its accessibility and usefulness. The only drawback to Magdalena Bay for this purpose is the scarcity of fresh water. It may be added that this place is about 1,100 miles from San Francisco, directly on the route to Panama.

At the extreme southern end of the peninsula the small town of San José del Cabo, containing a population of about 1,600, is located in a fertile little valley, where sugar-cane and other crops are grown. This is the largest agricultural town in the peninsula. Coasting steamers stop here regularly, lying off the open



CANYON OF SANTANA, NORTH OF SAN IGNACIO

One of the many wonderfully picturesque canyons which cut the great lava plateau in the southern half of the peninsula (see page 448)

NATIVE HOUSES AMONG THE DATE PALMS IN THE VALLEY AT SAN IGNACIO

Over 50,000 date-palm trees are growing in this beautiful oasis

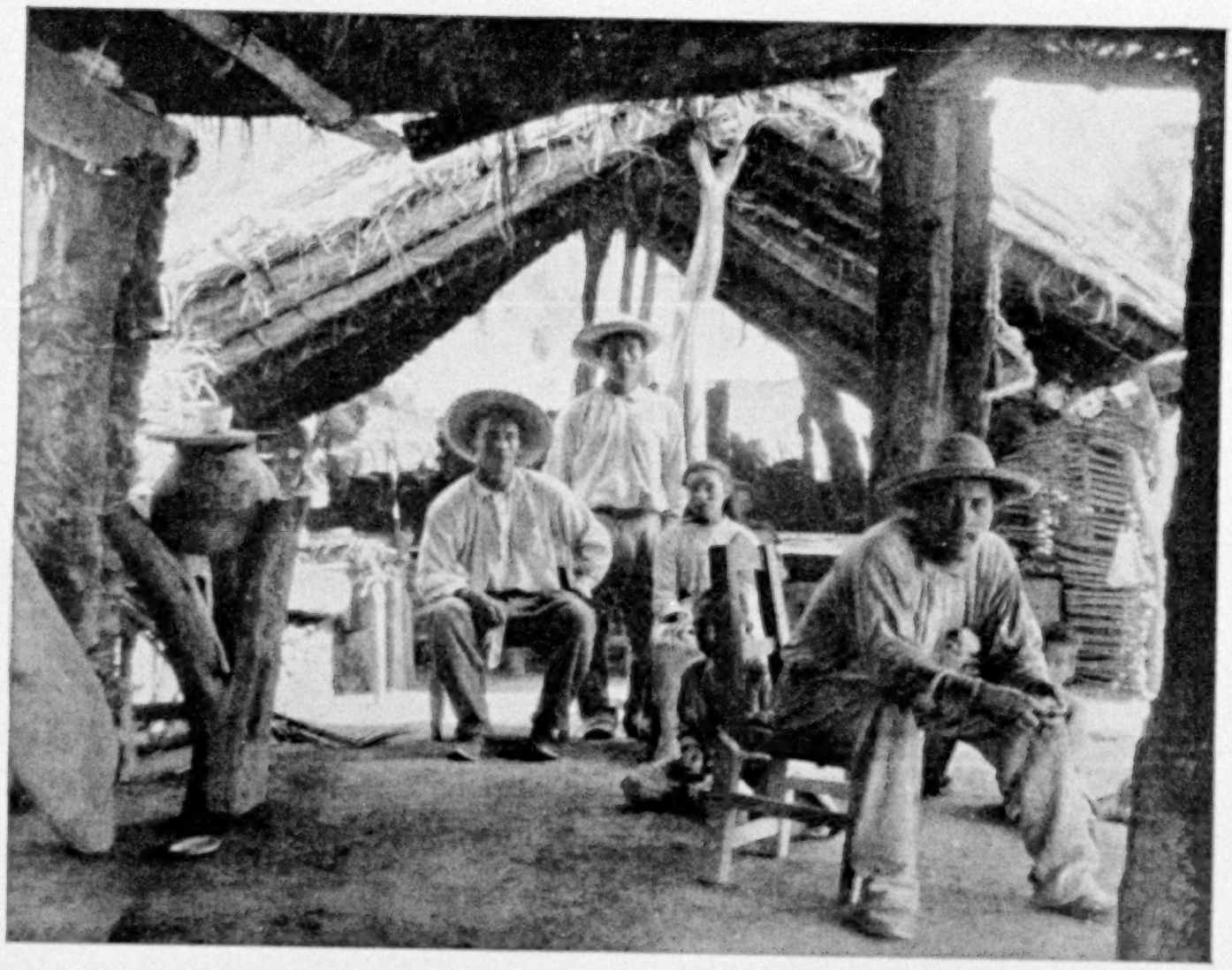
beach, to take on or leave passengers and freight.

LA PAZ IS AN ATTRACTIVE TOWN

La Paz, the oldest and most attractive town in Lower California, is at the head of La Paz Bay, in the Gulf. It is the capital of the southern district and the chief commercial port of the peninsula, containing nearly 6,000 people. The streets are well laid out and there are some excellent stores and many comfortable houses. The gardens are filled with palms and various tropical fruit trees, which give the place a strongly tropical appearance though set in the midst of an excessively arid desert plain. Water is abundant near the surface and is pumped for irrigation purposes. La Paz has always been the base of the pearl fisheries, which extend along the east coast of the peninsula and far down the west coast of the Mexican mainland. North of La Paz the only towns on the Gulf coast are the small agricultural settlements at Loreto and Mulege and the busy mining camp of Santa Rosalia, the largest town in Lower California.

A LAND OF LITTLE RAIN

The climate of Lower California in general is hot and arid, as evidenced by the existing desert conditions. In the northern part conditions are closely like those in the adjoining parts of southern California; in the middle they are more arid, but the extreme southern end, though arid tropical, has more regular summer rains. The rainfall on the peninsula comes from two sources. The winter rainy season along the north Pacific coast extends commonly over the northern parts of Lower California, and sometimes winter storms reach its extreme southern end. In summer the tropical rainy season extends across from the Mexican mainland to the southern end, and sporadic storms sometimes reach the northern border. The peninsula lies on the outer borders of the areas covered by both these rainy seasons and



INTERIOR OF THATCHED SHELTERS IN FRONT OF HOUSES IN DATE-PALM GROVES AT SAN IGNACIO

These are general living-rooms in hot weather. Note porous water-jar on left, in which drinking water is kept cool by evaporation from the outside of the jar

receives from them but scanty and uncertain precipitation.

Light frosts occur in winter on all the lowlands except a narrow belt along the immediate shore-line. At higher elevations, especially in the north, frosts are severe, and snow falls from one to six feet deep on the San Pedro Martir Mountains, where it sometimes remains for several months. The cool northwest winds and accompanying fogs on the west coast render the climate there much cooler and more agreeable in summer than that of the Gulf side, which is excessively hot and dry, temperatures commonly going far above 100° Fahrenheit in the shade.

The peninsula suffers long periods of drought, during which no rainfall sufficient to start vegetation occurs over large areas for periods of from three to five years. These dry periods may be succeeded by torrential rains, which sweep the country and roll great floods down the usually dry water-courses to the sea. During the long rainless periods the smaller desert herbage crumbles and is blown away, leaving the ground between the larger woody and fleshy plants as bare as though swept, and the larger plants become more or less dormant. With the heavy rains which follow, the bare earth is covered as by magic with an abundance of small flowering herbage and the larger plants burst forth into flower and foliage.

OLD MISSION CHURCH AT SAN IGNACIO, BUILT IN 1728

THERE ARE NO STREAMS OR RIVERS

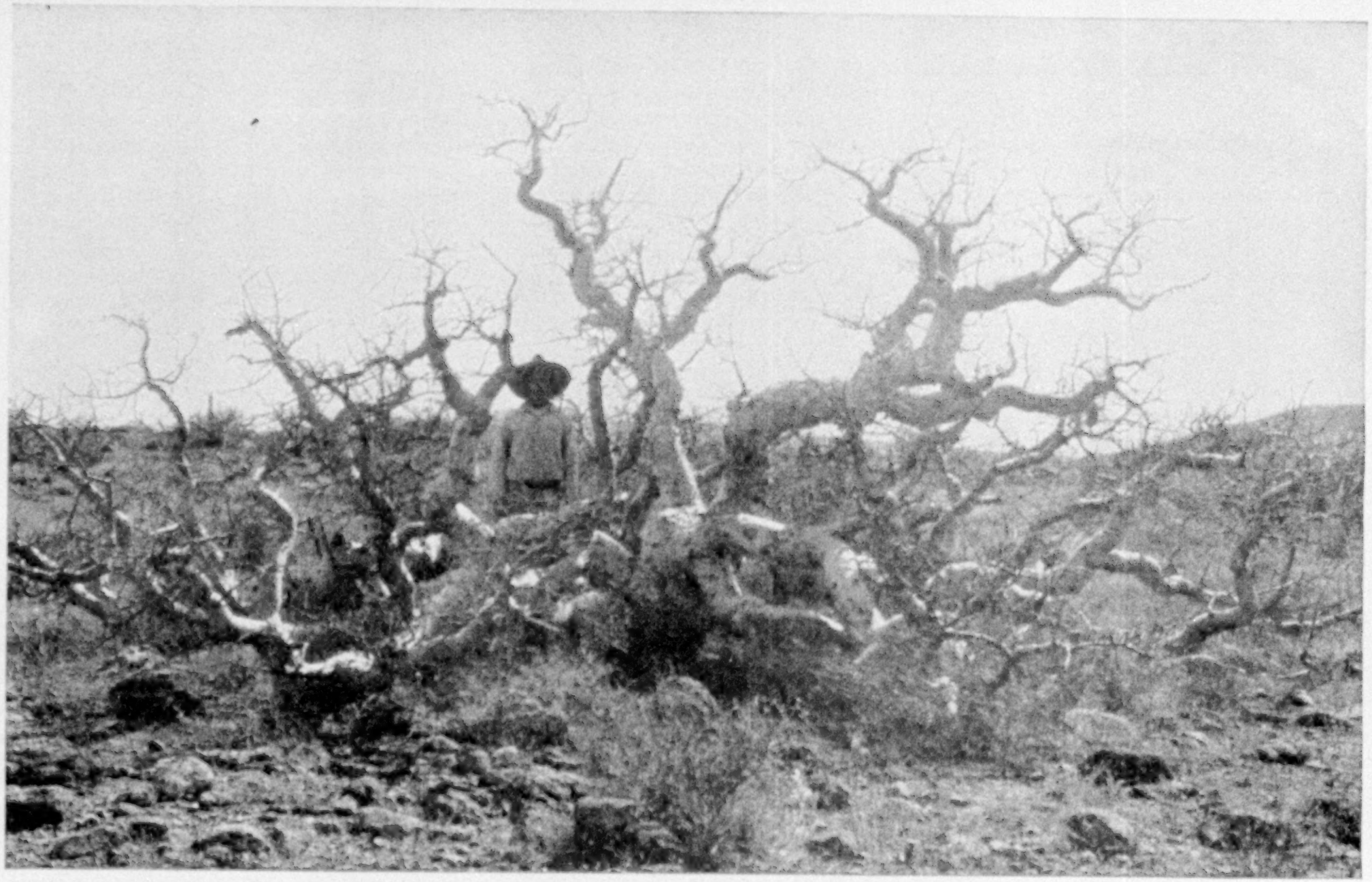
As a consequence of the lack of rain, surface water is very scarce and limited mainly to isolated water-holes in the rocks, or to springs from which small streams flow a short distance and then sink in the thirsty earth. In all its extended shore-line of more than 2,000 miles, only four or five small permanent streams reach the seashore, and all but one or two of these have their origin in springs rising a few miles inland, in the dry beds of canyons or other drainage channels.

The Rio Santo Domingo is the one living stream within the peninsula which flows on the surface from its source to the sea throughout the year. It rises high up on the west side of the San Pedro Martir Mountains and flows into the Pacific north of San Quintin.

This river—which is only a fair-sized creek—also has the distinction of being the only stream in Lower California which contains brook trout. In its course through a canyon in the foothills above San Antonio ranch we found many trout from 6 to 15 inches long. These proved to be a new species, related to the rainbow trout of California.

The next permanent stream, the Arroyo del Rosario, south of San Quintin, rises in the dry water-course and flows a few miles in the lower part of its channel to the sea. From this point southeasterly no flowing stream touches the shore until the mouth of the Arroyo de Todas Santos is reached, a distance of about 700 miles along the coast-line.

The eastern shore of the peninsula is even more poorly provided with running water, as the stream at Mulege is the only one until the mighty Colorado pours its flood into the head of the Gulf. In many places along both shores, however, good water may be obtained a few feet below the surface in flats or in the bot-



THE ELEPHANT WOOD (*Veatchia discolor*) IS ONE OF THE REMARKABLE TYPES OF DESERT VEGETATION KNOWN ONLY FROM LOWER CALIFORNIA (SEE PAGE 461)

It is a tree with a trunk one or two feet in diameter at the base, and six or seven feet high, with twisted and contorted branches tapering abruptly, and covered with a smooth, thick, spongy bark, which gives it a bloated, dropsical appearance. It has small compound leaves, which are shed annually. Before the leaves grow again the ends of the bare twigs are covered with a multitude of beautiful red flowers.

toms of some of the numerous dry drainage channels leading down from the interior. Many small streams flow varying distances, up to 10 or 15 miles, in the bottoms of canyons in the high interior and then sink in the bottom of the washes. Some of them are large enough to irrigate hundreds of acres of land and support little isolated communities, as those in San Ignacio, La Purisima, or Comondu valleys. Owing to the cooler temperatures and more regular rainfall on the high mountains, there is a considerable area of pine forest in the north and a small area of scrubby oaks and pines in the extreme south.

THE MOST EXTRAORDINARY FLORA IN THE WORLD

The isolation of the desert lowlands of Lower California, combined with alternations of long-continued droughts and heavy rains, has resulted in the development of the richest and most extraordinary desert flora in the world, of which the accompanying photographs give an imperfect idea. For days our trail led through a wild profusion of gnarled and thorny growths made up of many species. At other times the growth was thinly scattered and other species came in, or a forest made up almost entirely of agaves or yuccas extended for miles, to be succeeded by other combinations.

Although familiar with the varied types of plant life, from the stunted growth of Arctic tundras to the exuberant foliage of the humid tropics, I have never seen such a fantastic riot of extraordinary forms as that afforded by the flora of Lower California. The combinations of species were often wonderfully picturesque and gave the landscape an individuality unlike anything to be found elsewhere. Many of these strange scenes seemed fit abiding places for the animal life of an earlier age rather than the familiar species of today. The middle section of the peninsula in particular appeared to be common ground for an extraordinary abundance of strange desert types of vegetation.

The cirio (*Idria columnaris*) is peculiar to this region and one of the most abundant and unusual of them all. It has a tall, tapering trunk 20 to 50 feet high, with pale yellowish bark, many extremely thorny branchlets along its entire length, and tufts of small yellowish flowers on the end of long, slender stalks at the extreme tip. Thin forests of these pole-like trees cover hundreds of miles of the interior (see pictures, pp. 444-9).

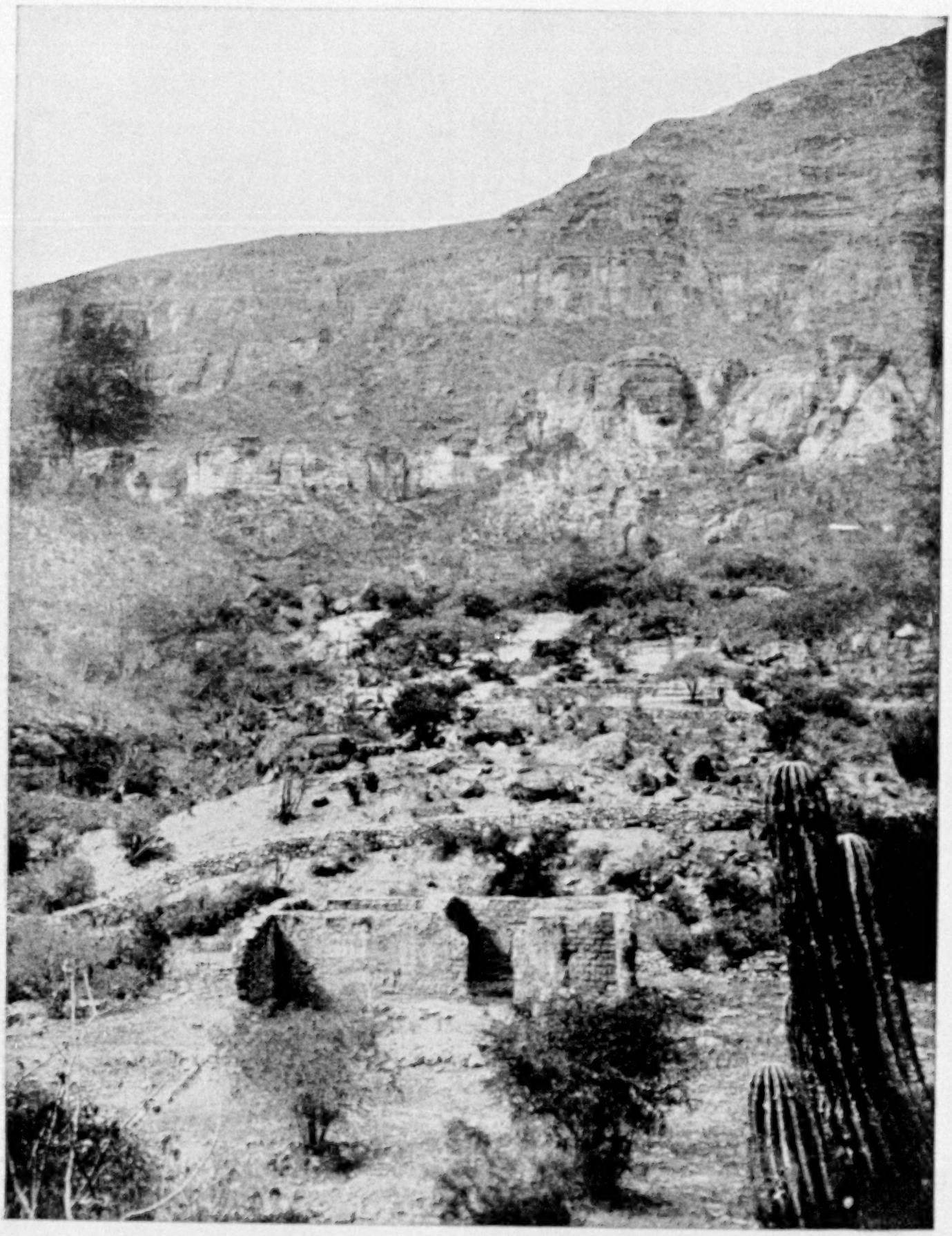
Cactuses of many kinds abounded, varying from giants standing with massive fluted trunks 50 to 60 feet tall to little straggling-stemmed species too weak to hold themselves upright. The fruit of many of these cactuses are edible and much sought for by birds and mammals. They were once one of the main crops of the Indians who lived in this arid region. The cactus forests often form impenetrable thorny jungles through which it was impossible to pass and which caused long detours when we left the trails.

THE CREEPING DEVIL CACTUS

After months among these thorny plants we supposed we had seen them in all their eccentric variations of form. One morning, however, while crossing the Llano de Yrais, in front of Magdalena Bay, I rode out from a dense growth of bushes into an open area and pulled up my horse in amazement at sight of the most extraordinary of them all. Before me was a great bed of the creeping devil cactus, which appeared like a swarm of gigantic caterpillars creeping in all directions. These plants actually travel away from the common center of the group, and I saw many single sections 20 to 30 yards away from the others. The part of the stem resting on the ground sends down rootlets and the older stems die in the rear at about the same rate as they grow in front, so they slowly move away from the colony across the flats where they live (see picture, page 466).

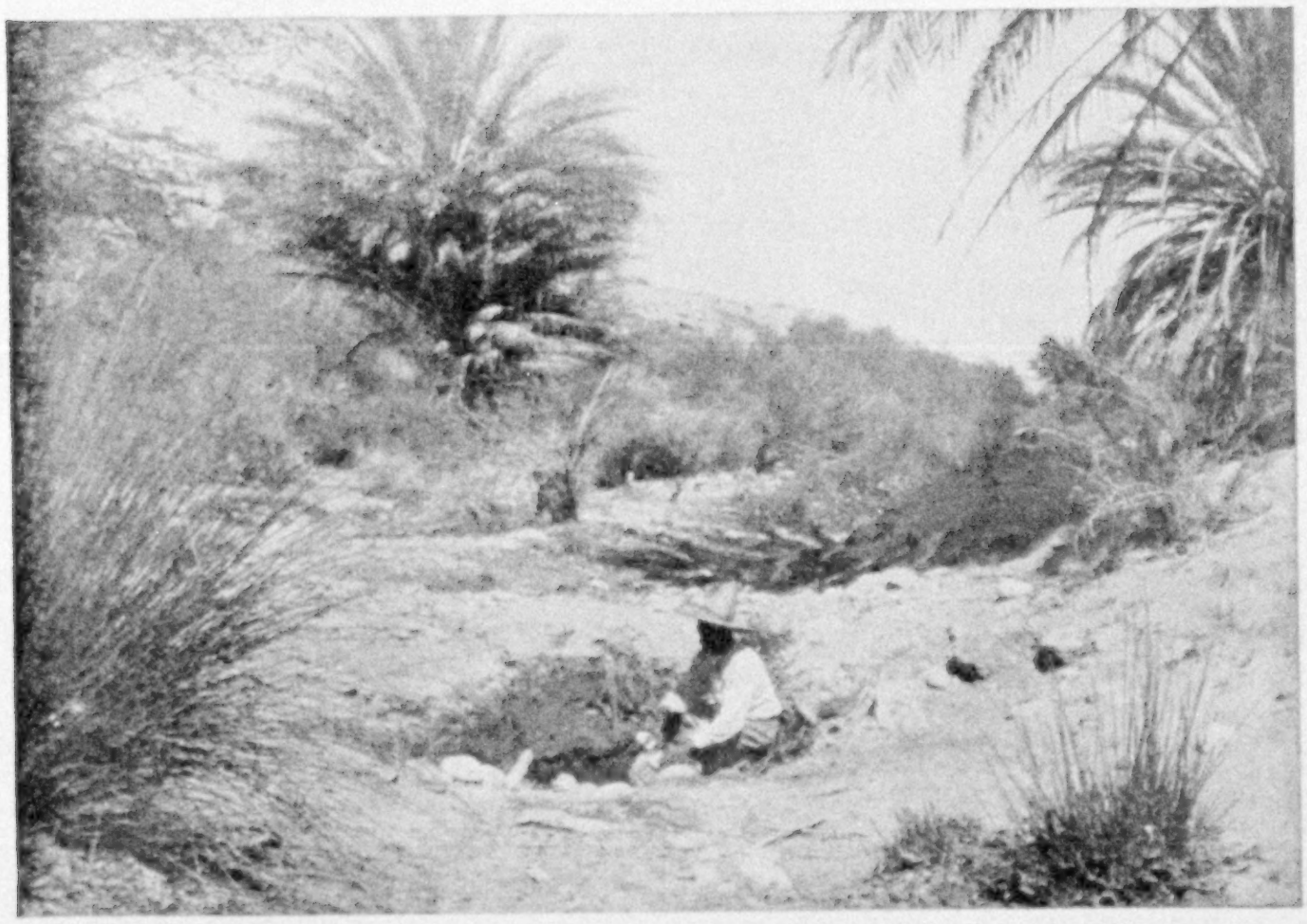
Another most remarkable plant is the elephant wood (*Vcatchia discolor*), which, like the cirio, is confined to the

XUM



GUAJÁDEMI, AN ABANDONED RANCH NORTHERLY FROM LA LURISIMA

Note the extensive stone walls. Americans have made a number of attempts to establish agricultural enterprises and colonies; but, with the exception of the recent development of agricultural lands by use of water from the Colorado River, immediately south of the border, opposite the Imperial Valley, California, these efforts have been almost uniformly unsuccessful.



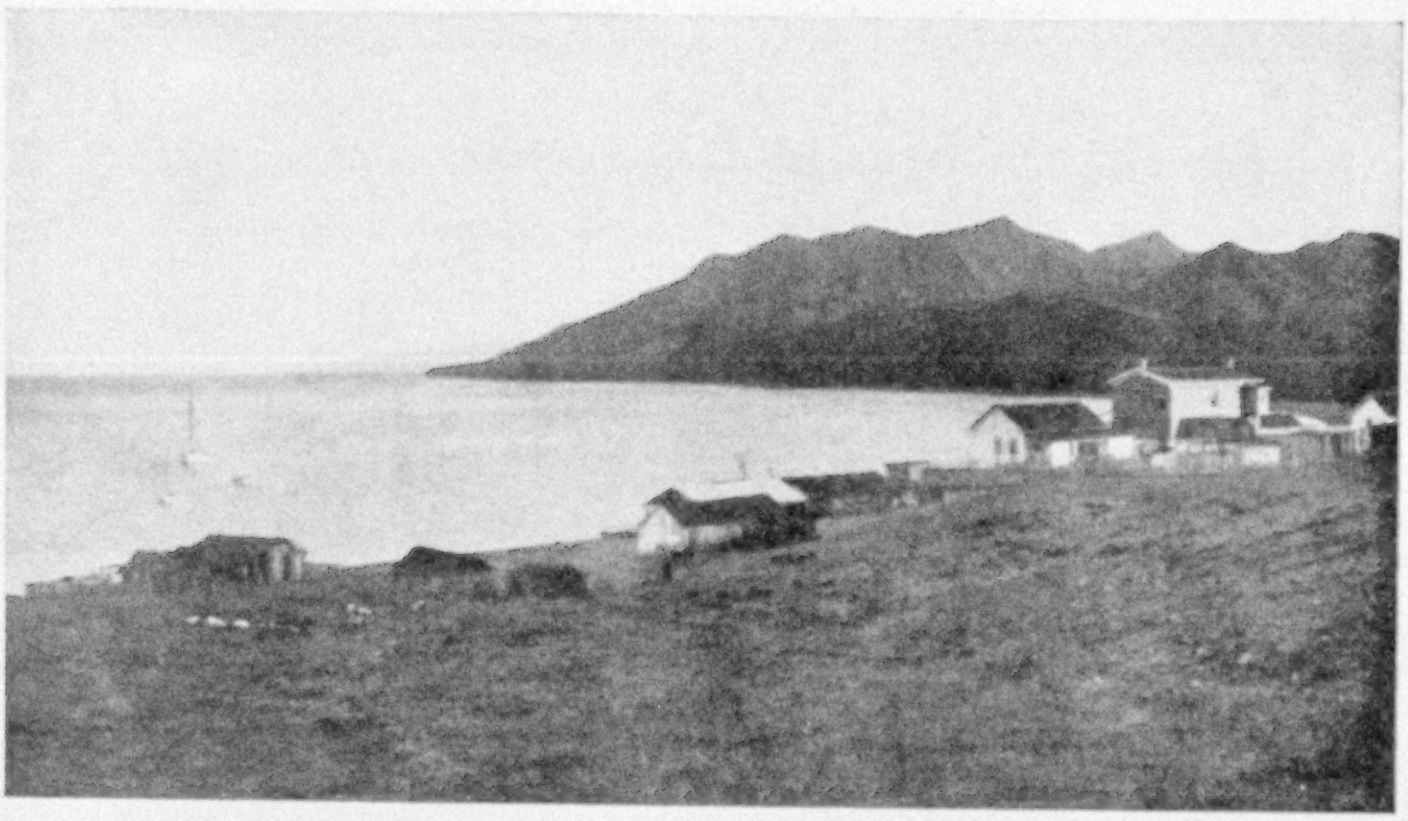
WATER-HOLE AT SAN ANGEL, ON THE EASTERN BORDER OF THE SANTA CLARA DESERT, 20 MILES WESTERLY FROM SAN IGNACIO

"I have come repeatedly to solitary water-holes, in the hottest weather, a long march from any other water, and found the loose earth about their borders undisturbed by tracks except those of birds, while within a few rods were tracks where wandering deer and rabbits had fed day after day with absolute indifference to the proximity of water. A large number of the smaller kinds of desert mammals, rats, rabbits, etc., never drink water. Apparently they never know thirst or the delight of quenching it" (see page 467).

middle parts of the peninsula, but occurs also on Cedros Island. It is a curious dropsical-appearing tree, from three to six feet high, with a trunk measuring a foot or two in diameter at the base and sending out thick, wide-spreading, contorted branches. Both trunk and branches are covered with a smooth-skinned bark lying in thick folds and curves, as though much swollen (see picture, page 460).

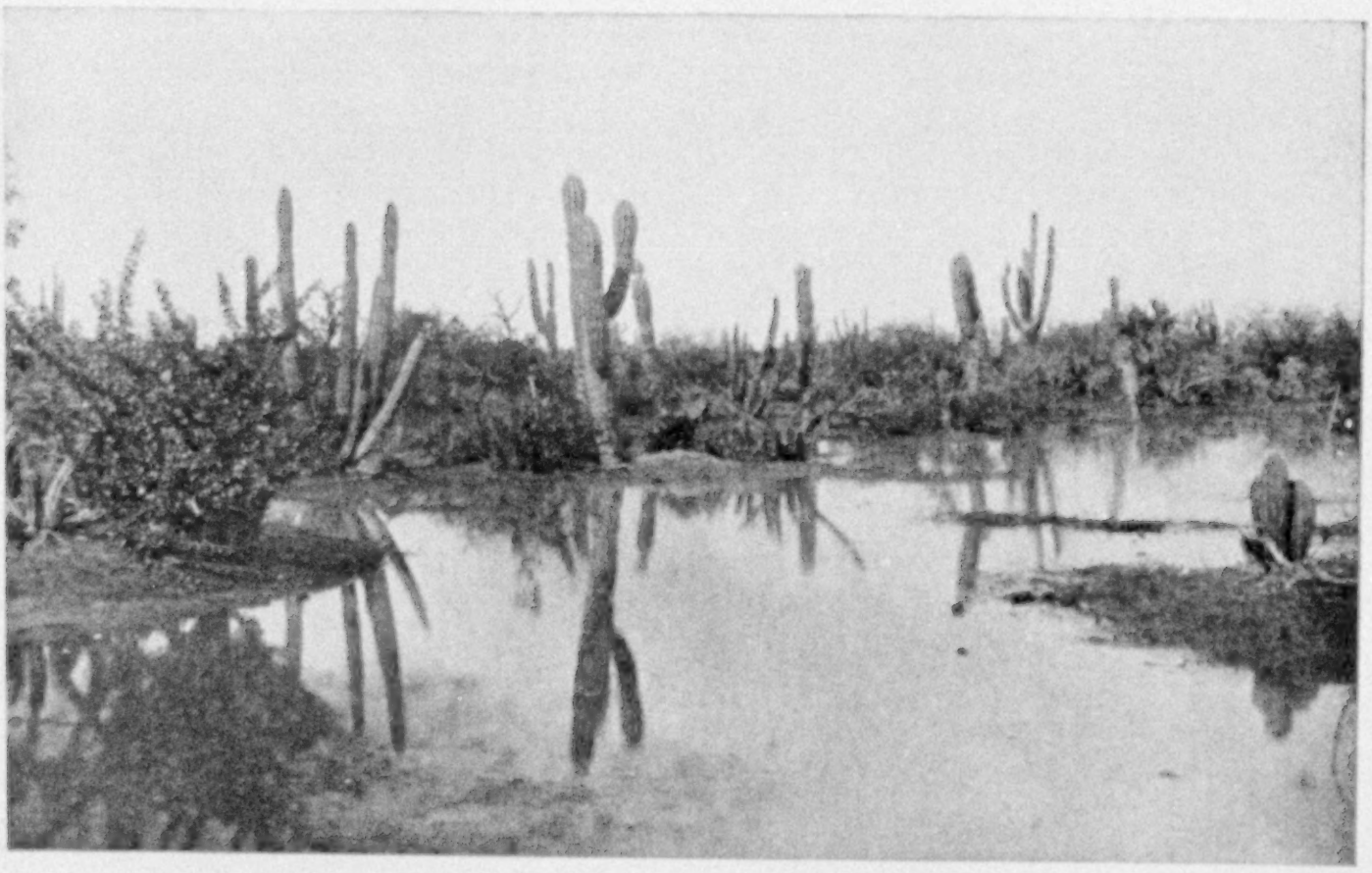
Here and there we saw combinations of plant forms so beautiful and strange as to suggest the flora of a past geologic age. This was specially notable in the Arroyo de Cataviña, a broad, dry wash of white sand winding through a shallow valley in a granite plain. Along the bottom near the wash were little groups of exquisitely graceful palms, their beauty heightened by the formal stiffness of their neighbors, the tall cirios, cactuses, and Fouquieras (see picture, page 452).

For hundreds of miles our route lay through these curious forests, and we found them most impressive when we were obliged to make long night marches to reach distant water-holes. For hours we rode silently in the brilliant moonlight through an unbroken succession of grotesque forms, half revealed by the uncertain light, until we seemed to be traveling in the unreal world of some fantastic imagination. On these occasions we traveled until the moon went down and left us in the black darkness



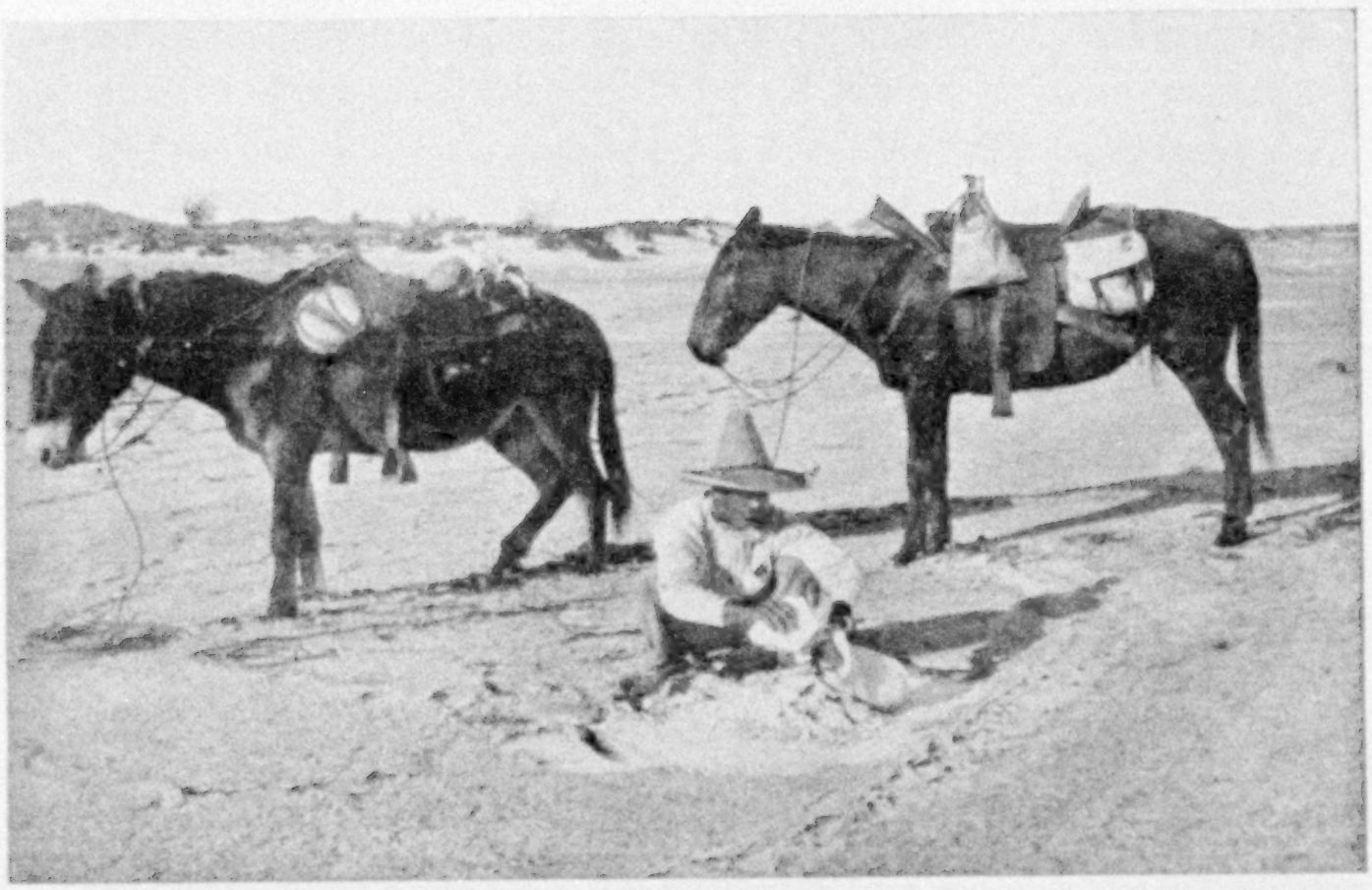
THE BEST HARBOR ON THE PACIFIC COAST SOUTH OF CALIFORNIA: MAN-O'-WAR COVE, MAGDALENA BAY (SEE PAGE 455)

With the village of Magdalena in the foreground and Margarita Island showing dimly in the distance. The entrance to Magdalena Bay is behind the southerly end of Magdalena Island, shown in this view, and in front of Margarita Island.



FLOODED PLAIN BORDERING MAGDALENA BAY, IN DECEMBER

The desert vegetation standing in the water made a strange and fantastic landscape



GATHERING ROCK-SALT FROM THE GREAT SALT BED ON THE SANTA CLARA DESERT, WEST OF SAN IGNACIO (SEE PAGE 445)

Enormous salt deposits exist on this desert and elsewhere in Lower California

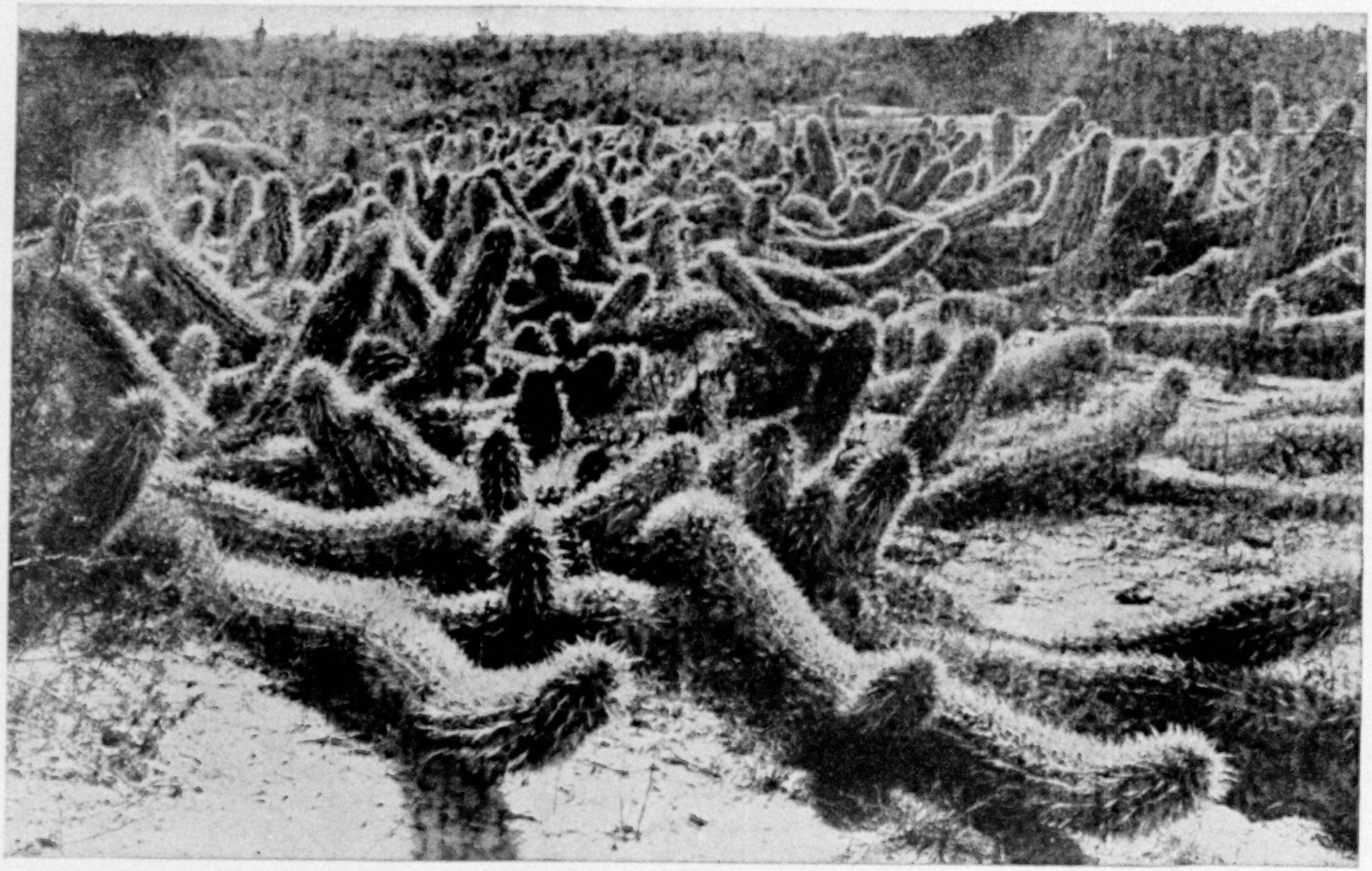
that followed to make camp as we could. Our camp men then gave us the benefit of their desert craft by setting fire to a dense group of half-dry yuccas, which almost at once set up a splendid torch-like red flame 8 or 10 feet high, brilliantly illuminating a broad circle for about half an hour, thus giving us ample time to unload the mules and arrange camp. Yuccas are fired in this way, also, to bring together members of a party when separated at night.

HONEY-BEES IN THE DESERT

During our stay in the pine-forested highlands of the San Pedro Martir Mountains we were interested to find swarms of wild honey-bees rather common in hollow trees up at least to an altitude of 8,000 feet. These were the descendants of swarms escaped from the bee-farms of southern California. Later, when we were on the coast plain at San Quintin, we found them living in small deserted cabins, their combs hanging free from the under side of the roof. They had also penetrated some of the most arid desert sections along the Gulf coast more than 200 miles south of the border.

In September, at the time of our visit to Dick Daggett's camp, at the mouth of Calamahue wash, scores of wild bees were buzzing about a canvas water-cooler hung in an open shed, thirstily sucking the moisture and then flying away over the sun-baked, cactus-grown hills. Daggett said his men lined the bees from this water, and then, by using burning beeswax and honey for bait, were able to find many nests in the rocks or in hollow stems of the cirio, and thus kept him well supplied with honey.

The recently made well here was the only available water supply for a long distance, but bees appeared very soon after the well was dug. Daggett informed us that some of the nests were found several miles from camp, thus in-



CREEPING DEVIL CACTUS (*Cereus eruca*) (SEE PAGE 461)

This is a species peculiar to Lower California. It grows in patches, covering the ground with its long, sinuous, reclining stems, which, with their raised heads, have the appearance of a great band of enormous spiny caterpillars creeping away. It is known only from a small district near Magdalena Bay.

dicating an extraordinarily long flight for these bees, which are unable to exist where they cannot get water.

MANY OF THE ANIMALS NEVER DRINK WATER

The bird and mammal life of all Lower California is closely related to that of southern California. Only a few species of birds and a single land mammal, all in the extreme southern end of the peninsula, appear to have originated on the Mexican mainland. All the others are evidently derived from well-known species of southern California, though they have been isolated long enough to develop numerous geographic forms. This is in strong contrast to the great differences shown by the flora, in which are numerous strongly marked species peculiar to this region.

As in similar arid areas of the extreme southwestern United States, the plains of Lower California ordinarily abound with small desert mammals, such as rabbits, pocket mice, kangaroo rats, and others. During long-continued dry periods vast numbers of these small mammals perish of starvation, owing to the failure of the necessary crops of succulent and seed-bearing herbage; but after two or three years of renewed rainfall and abundant plant life the desert again swarms with countless numbers of these small folk.

A large number of the smaller kinds of desert mammals never drink water. They live and thrive on dry seeds and scraps of vegetation in places where the heat and aridity are excessive without ever touching their lips to water, and it has even been found impossible to teach some of them to take water in captivity. Apparently they never know thirst or the delight of quenching it.

Large desert mammals, such as rabbits and deer, also obtain sufficient moisture by eating the succulent parts of certain plants they know how to find.

CUNNING FOXES

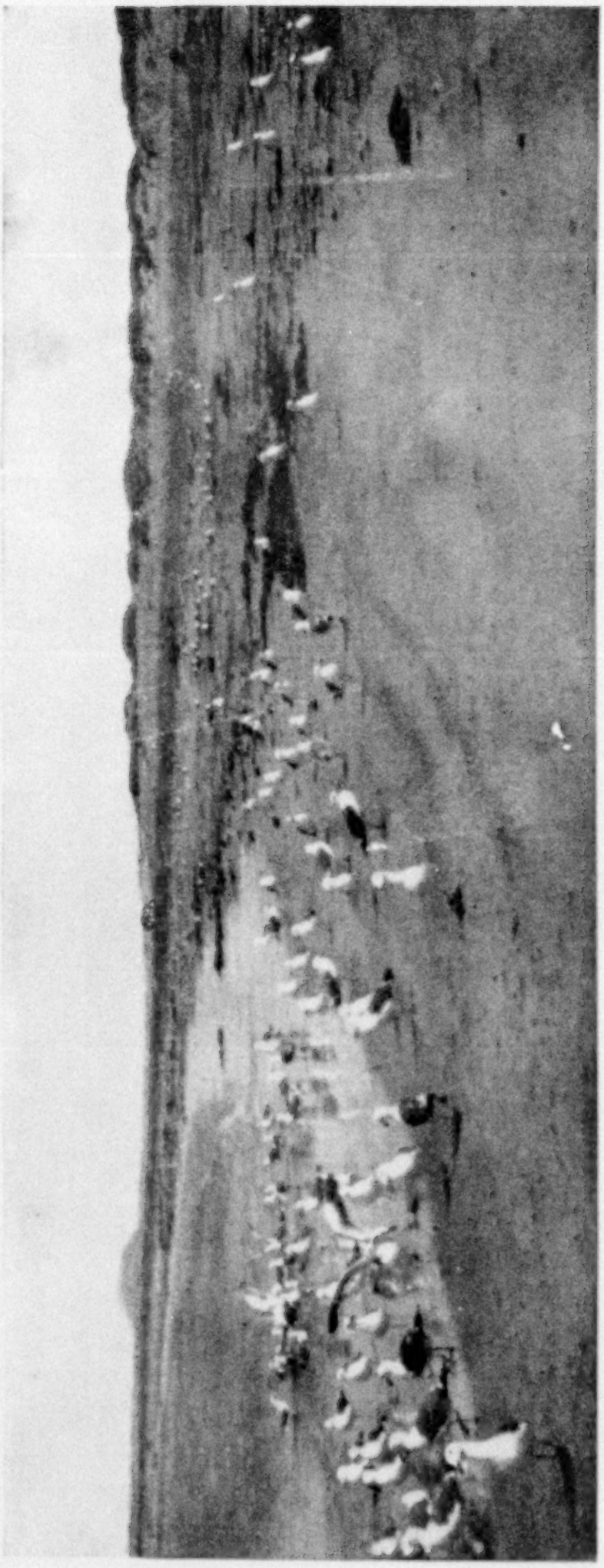
I have come repeatedly to solitary water-holes, in the hottest weather, a long march from any other water, and found the loose earth about their borders undisturbed by tracks except those of birds, while within a few rods were tracks where wandering deer and rabbits had fed day after day with absolute indifference to the proximity of water. The ability to do without water on the desert appears to be peculiar to rodents and other herbivorous mammals, since we found no signs of carnivorous species far from accessible water.

Small desert foxes, with large ears and bodies not much larger than that of a cat, occur on the larger plains throughout the peninsula. They live in burrows and when surprised away from home by day are very cunning in concealing themselves. As danger approaches they skulk to the nearest bush, tuft of grass, or other little object breaking the surface and sink down flat on the ground beside it, and although they may be in plain view, they are almost certain to escape notice unless seen before they reach shelter. When concealment becomes impossible they are up and off like a flash, and so swift and graceful are their movements that they appear to float across the plain like a yellowish gray streak. On the Magdalena plains the cowboys ride down and lasso coyotes for sport; but when I suggested their trying it on one of these foxes, they laughed and replied that they might as well try to catch the wind.

Antelope, mountain sheep, mule-deer, and mountain lions are the only large game animals on the peninsula. Antelope formerly occupied all the plains, but are now reduced to a small number in a few localities, and there appears to be little hope of saving them from early extermination. Deer are still numerous in many localities and with the mountain lion will outlast other large game in that region.

BEAUTIFUL MOUNTAIN SHEEP

The first mountain sheep discovered in America were those recorded in the early writings of the Spanish missionaries from Lower California. There are numerous species of mountain sheep in



WESTERN GULLS (*Larus occidentalis*) ON THE BEACH: SAN MARTIN ISLAND, NEAR SAN QUINTIN BAY

These beautiful birds are savage and remorseless destroyers of the eggs and young of other birds breeding on the islands they frequent (see page 471)

the old and new worlds, and most of them have their homes about high and desolate mountain crests rising above the coniferous forests at timber-line, where they live amid arctic or semi-arctic conditions. Among the mountain sheep of Lower California these common conditions of life are reversed and they occupy the low desert ranges parallel to the Gulf coast from sea-level up to 4,000 or 5,000 feet altitude, always below the lower limit of the coniferous forests which adorn the upper levels of the high mountains in the northern part of the peninsula.

Here the summer temperatures are commonly much more than 100° Fahrenheit in the shade, and the arid mountain slopes have a scanty growth of cactuses, yuccas, Fouquieras, and other strictly desert plants. These sheep commonly go to water when available in the hot, dry summers, but are able to exist for considerable periods, even in hot weather, on the moisture obtained from the fleshy visnaga cactus, the tender flowers and flower stalks of agaves and yuccas, and from other water-storing desert plants.

During the last few years numerous American sportsmen have hunted these sheep in the barren mountains in the northeastern part of the peninsula. During this period the sheep have decreased considerably in numbers, mainly, however, through

A WATER-STORING PLANT (*Ibervillea*)

It has so much liquid stored that it can go on sending out vines, flowering, and fruiting years in succession without a drop of rain (see NAT. GEOG. MAG., August, 1910, p. 694)

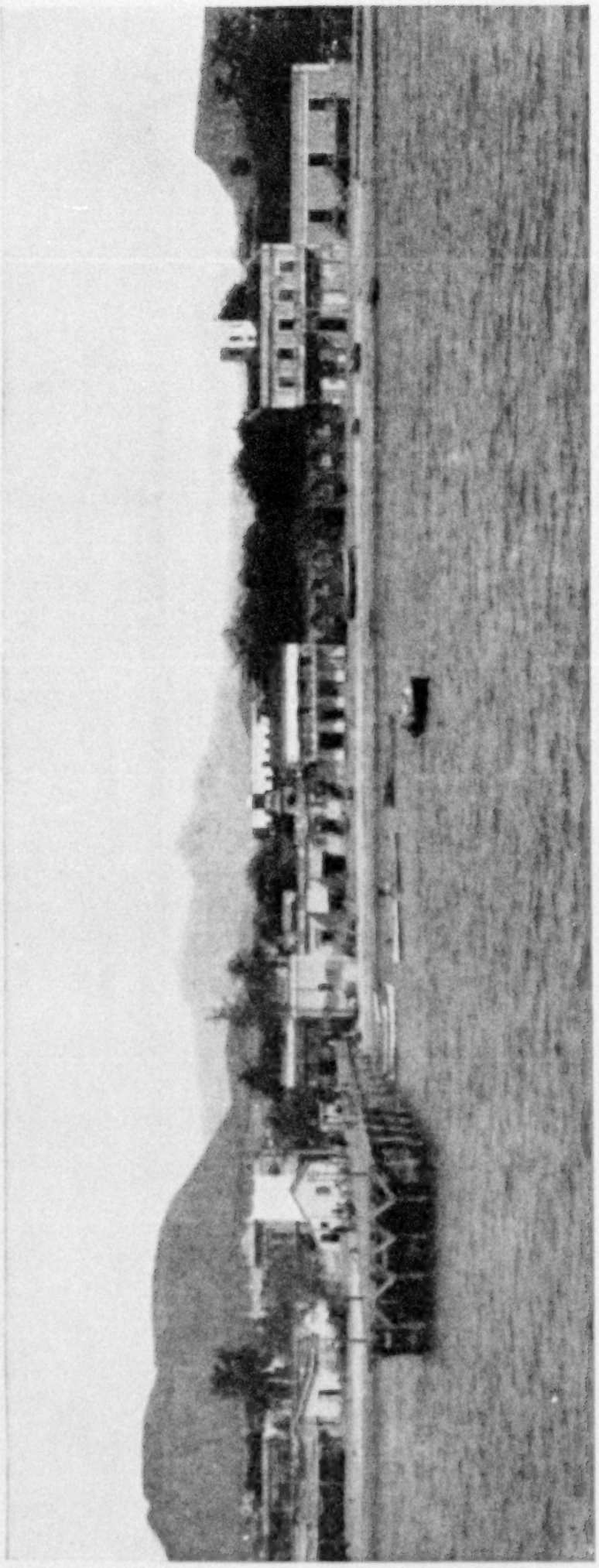
indiscriminate slaughter by native hunters for the purpose of supplying meat to mining camps. Unless this kind of hunting can be rigorously suppressed and other hunting controlled, these splendid game animals are doomed to certain and early extermination.

THE HYDROPHOBIA SKUNK

In addition to the mammals already mentioned, wild cats, badgers, spotted skunks, raccoons, coyotes, and another kind of fox make their homes on the desert.

The spotted skunk, or hydrophobia skunk, as it is commonly called, is most abundant in the extreme southern end of the peninsula, where it is looked upon with fear and abhorrence, owing to its habit of biting people in the face while they are sleeping on the ground and the reputed commonly resulting death of the victim by rabies. The fear of these animals extends throughout the peninsula, and we were warned of the danger from them when we were preparing for the trip.

When we were at the village of Cape



SEA-FRONT OF LA PAZ, THE OLDEST AND MOST ATTRACTIVE TOWN IN LOWER CALIFORNIA

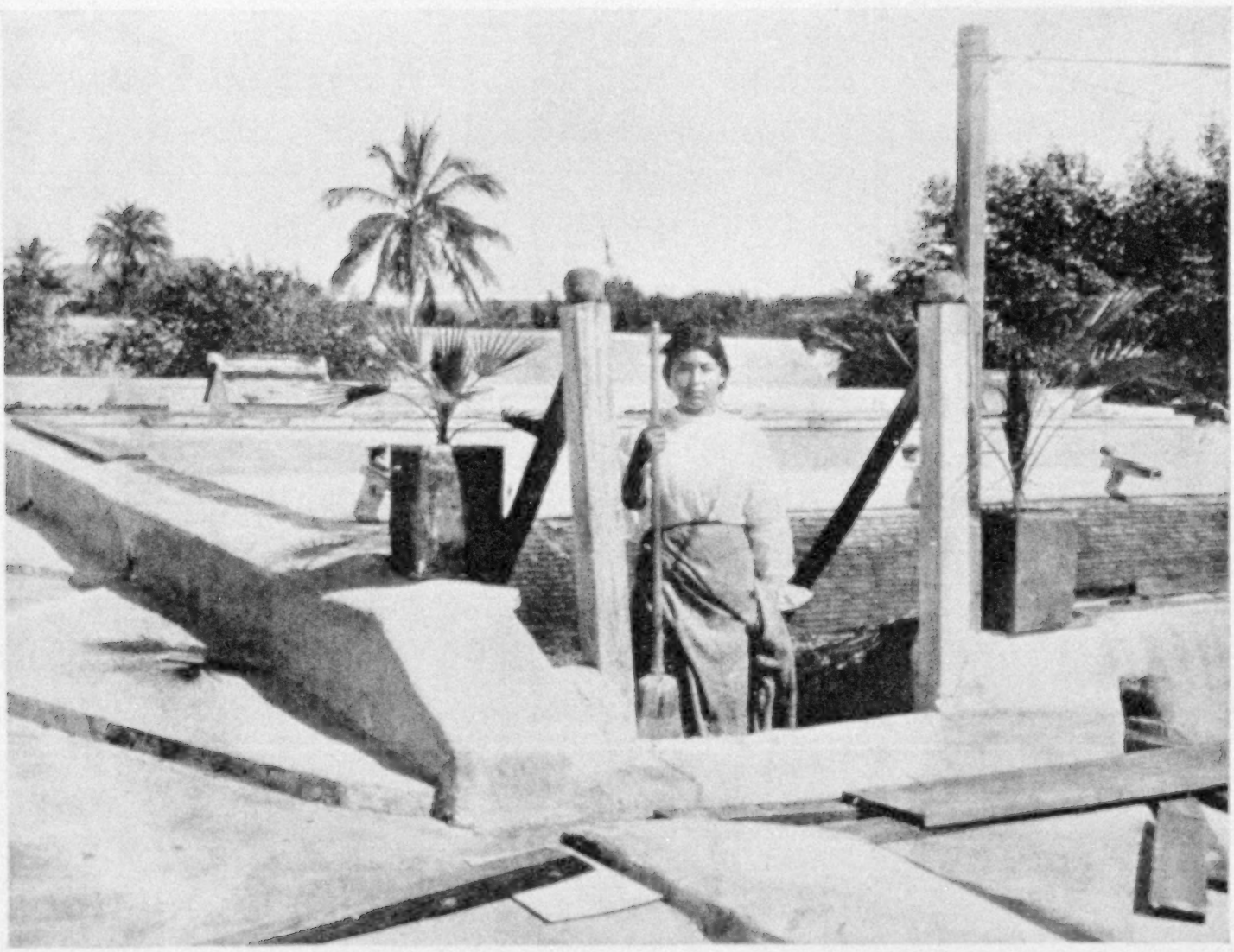
It is the capital of the southern district, and has always been the center of the pearl fisheries of this region. The United States coaling station, in Pichilingue Bay, is located a few miles north of La Paz, on the east side of La Paz Bay (see pages 455 and 457)

San Lucas, the first of January, one of the villagers brought me the body of one of the skunks, which had entered the open door of his house the preceding night and bitten his little girl through the lip. The child was brought to me the next day and the two marks where the skunk's canines had pierced the lip were already healing without inflammation. I have no further knowledge of the outcome in this case, but was told of the death of one of the men of the village the previous year from a similar bite.

FRIENDLY QUAIL AND RAVENOUS GULLS

Doves and California Valley quail were numerous the entire length of the peninsula, their presence always indicating the vicinity of permanent water. One of the most attractive sights about our camps at desert waterholes was the trooping in of these birds to drink. They were so unaccustomed to man and his ways that they were entirely unafraid, and after drinking the quail stood quietly preening their plumage, or moved carelessly about, uttering little subdued call-notes to one another.

Hawks, woodpeckers, jays, ravens, fly-catchers, cardinals, mocking-birds, cactus wrens, and other small birds enlivened the desert and were abundant about some of the cultivated oases. A desert



LOOKING ACROSS THE ROOFS OF LA PAZ, WITH A NATIVE SERVANT AT THE TOP OF STAIRWAY LEADING TO THE LOWER FLOOR

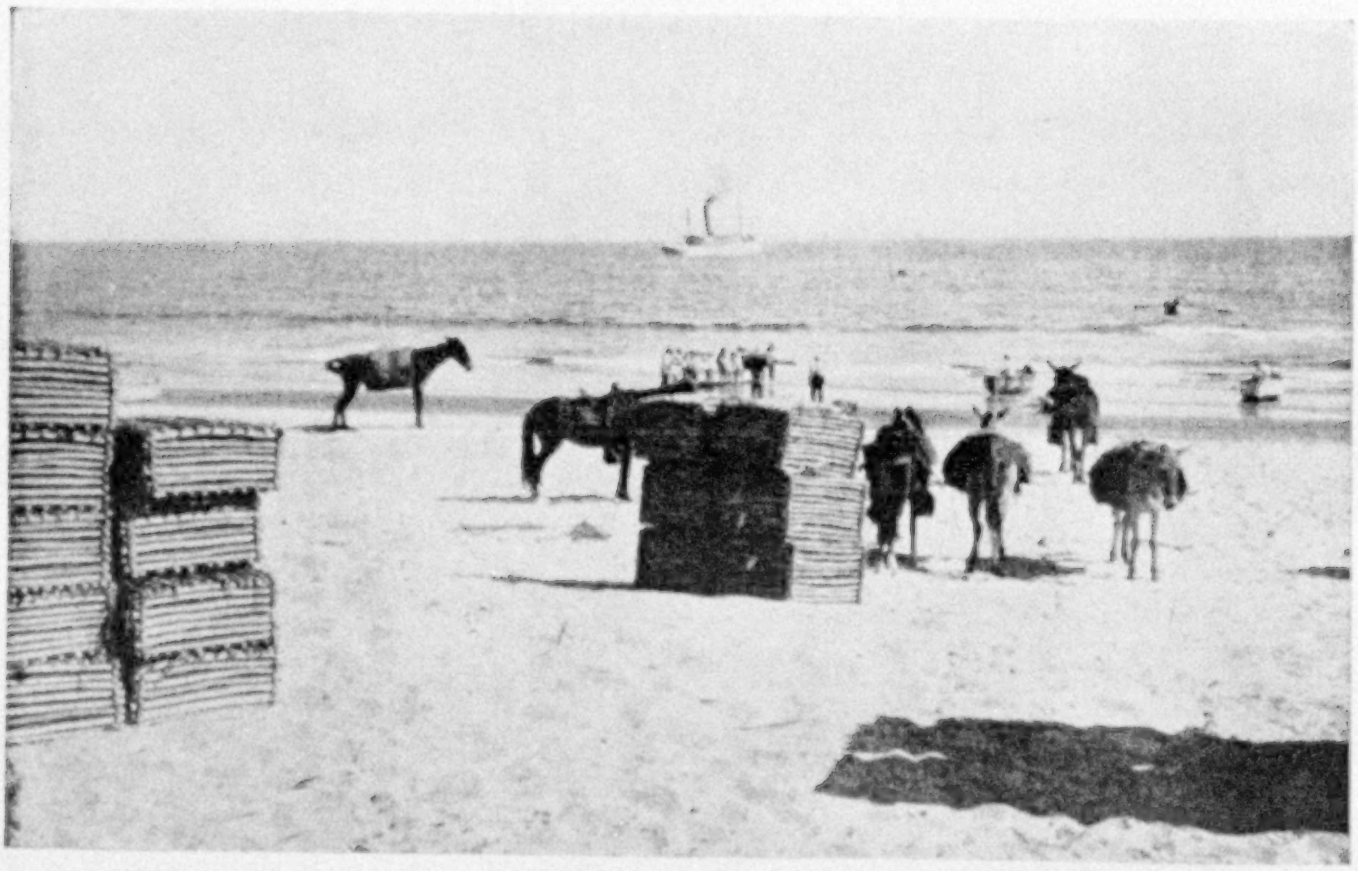
thrasher was abundant in the yucca forest near Santo Domingo Landing, and in early morning and evening charmed us by its exquisitely musical notes.

On San Martin Island, near San Quintin, in July, we found many cormorants breeding, with some families of young in the nests. While we wandered over the island we were accompanied by a low-flying escort of western gulls.

Whenever a cormorant, alarmed by our approach, flew away, the gulls swooped down on the exposed eggs and ate them at once; or, if we were too near, each gull transfixed an egg on its beak and flew away, draining the contents as it went. On two occasions I saw gulls alight on nests and calmly pick up young cormorants weighing 5 or 6 ounces each and swallow them entire, the helpless victims being swallowed head foremost, their feet waving despairingly from the gull's widely spread beaks as they disappeared.

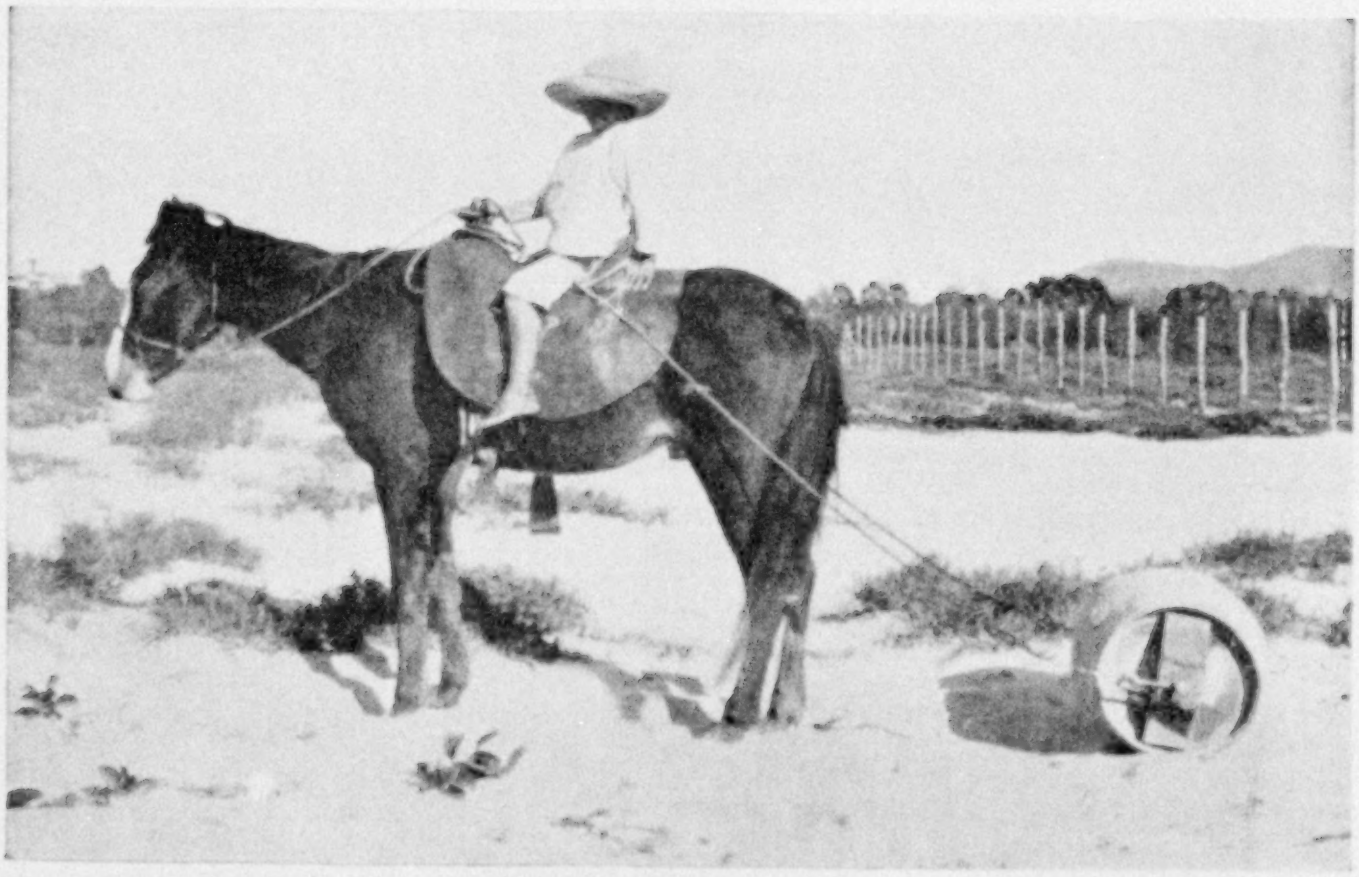
THE CALIFORNIA CONDOR

While at La Grulla meadow, in the San Pedro Martir Mountains, we were fortunate enough to secure our first California condor, a huge bird, sometimes measuring nearly 11 feet across its outspread wings. We afterwards saw others and had a most enjoyable experience watching a dozen or more of them in superb flight as they swept back and forth over the pine forest or soared up and disappeared in the blue sky. When these birds were perching on a dead tree the turkey buzzards near them looked like pygmies.



LANDING PLACE ON OPEN BEACH AT SAN JOSÉ DEL CABO

Crates of brown sugar in small cakes for export have just been unloaded from the pack animals. This town contains about 1,600 people and is situated in a fertile valley at the extreme southern end of Lower California.



ROLLING WATER-BARREL AT SAN JOSÉ DEL CABO

A ring on the end of the rope at each end of the barrel is placed over the head of a projecting bolt and the water-filled barrel then trundled after the horse. Ranches are sometimes supplied with drinking water in this manner from a spring or water-hole several miles away.

COWBOY IN SOUTHERN LOWER CALIFORNIA

He is wearing the usual leather-covered hat, leather jacket, and leather aprons over his legs to guard against the thorny vegetation. Frequently the horses have a leather apron hanging over their breasts for the same purpose.

The natives formerly cut off the large hollow bases of the quill feathers of these gigantic birds and, fitting them with stoppers, used them for carrying fine gold at the placer mines.

Owing to its desert character, the peninsula is thinly peopled and enormous areas remain uninhabited. The most populous section was the region south of La Paz, where rains are more regular than farther north. A few small towns and widely scattered small communities along the coast, with a limited number of villages, ranches, and miners' camps in the interior, cover the population. That repeated unsuccessful and usually ill-advised efforts have been made to conquer the desert was evidenced by the many deserted and ruined ranch-houses we passed on our route.

The tale of unbroken failure of the efforts made during the last 50 years to establish agricultural colonies in Lower California is sufficient evidence of the stern desert conditions which prevail. A few propitious rainy years have encouraged visions of success, but the succeeding rainless years have brought disaster with them.

In addition to climatic discouragements, the early missionaries encountered other troubles, for Padre Baegert, who

lived from 1751 to 1767 in the southern part of the peninsula, tells of great plagues of grasshoppers, which swept from the south toward the north, obscuring the sun by their numbers and making a noise like a strong wind. He says they devoured all green things as they passed over the country.

MANY PARTS OF LOWER CALIFORNIA ARE CAPABLE OF RICH DEVELOPMENT

Although the foregoing account of conditions prevailing in Lower California appears to indicate a hopeless desert, yet almost without exception where agriculture has been tried intelligently, with a sufficient water supply developed for irrigation, the soil has responded bountifully. The possibilities of agriculture were proved centuries ago by the missionaries located in valleys, where water from large springs enabled them to grow wheat and many other crops. At present peas, beans, corn, cotton, tobacco, sugar-cane, grapes, bananas, figs, oranges, lemons, limes, pomegranates, dates, olives, and other fruits and vegetables are grown.

The hot, dry climate and other conditions of the middle and southern parts of the peninsula lend themselves especially to the cultivation of the choicest varieties of date palms and to numerous tropical fruits.

The largest and most important single area of agricultural development will no doubt be about the delta of the Colorado. The storage of surface water and development of the underground supply should render considerable areas productive on the plains of San Quintin and Magdalena. Wherever land is now irrigated in the older settlements, proper control of the available water would greatly enlarge the productive area. The greatest drawbacks at present to both mining and agricultural development of the peninsula are the unenterprising character of the native population and lack of transportation facilities.

OUTLINE MAP OF UNITED STATES, SHOWING TERRITORY ACQUIRED BY TEXAS ANNEXATION AND MEXICAN CESSION

OUR NEIGHBOR, MEXICO

By John Birkinbine

Past President of the Franklin Institute of Philadelphia and of the American Institute of Mining Engineers

With Photographs from the Author

IN discussing the truly interesting country which for 1,800 miles forms the southern boundary of the United States, the intention is to treat it in a neighborly spirit and neither as cynic nor apologist; to summarize some geographical and topographical features, indicate the nation's present position in commerce and industry; to recall a few historical facts, and tell of the people from an acquaintance of nearly 30 years.

The visits to Mexico, while far from covering all of the Republic, have been in connection with engineering problems, and have included cities, towns, pueblos, haciendas, ranches, or camps upon desert or among mountains, presenting opportunity for acquaintance with the various physical features, with the mineral wealth, and with the activities and environment of the people.

In formulating opinions I have had the benefit of an extended acquaintance in Mexico, and also of investigations by three sons who as business associates have visited the Republic, one residing in that country for the past five years.

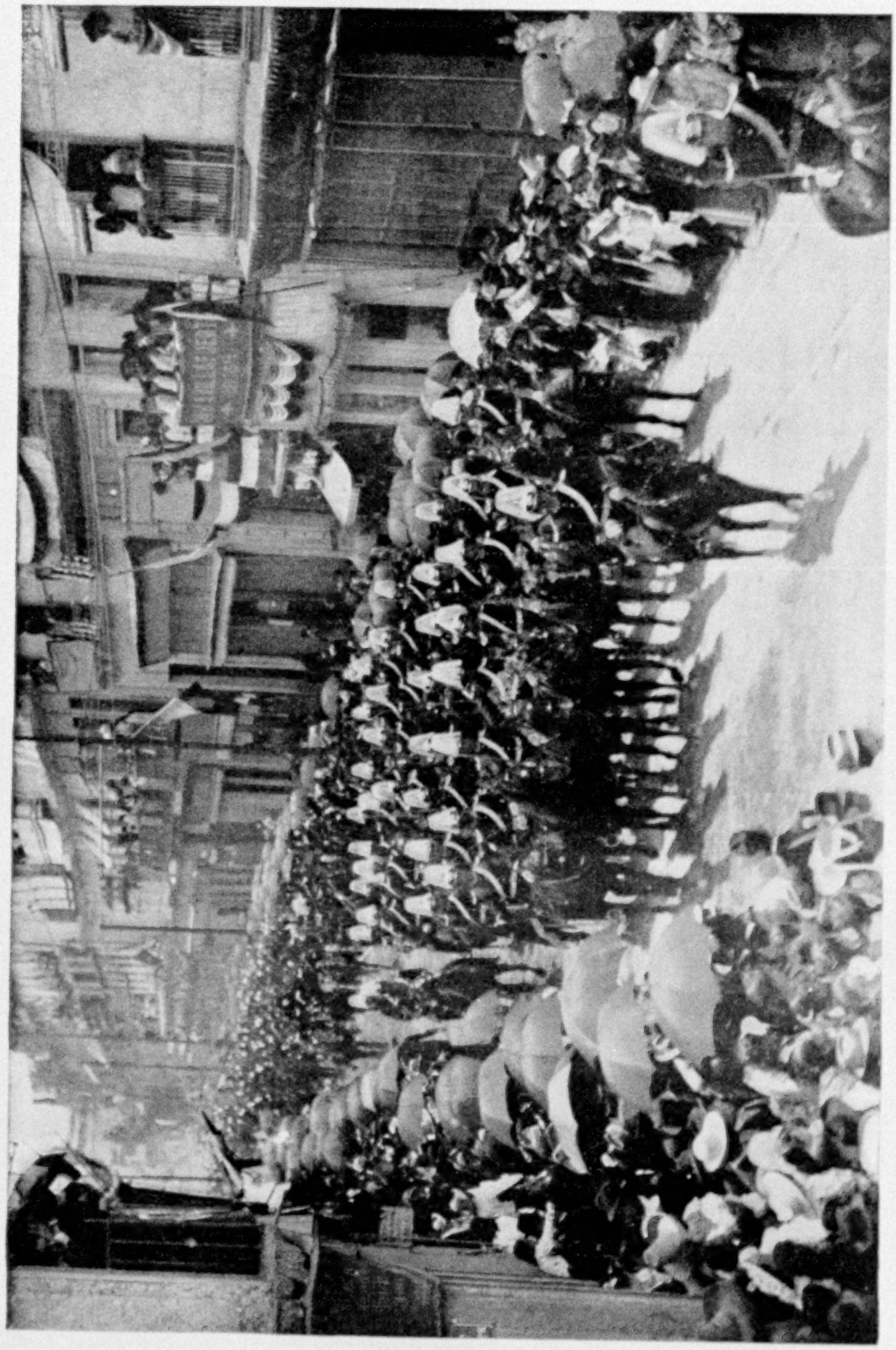
A résumé must necessarily be general which refers to territory practically as great as that of the United States between the Mississippi River and the Atlantic coast, the Great Lakes and Gulf of Mexico, varying in altitude from sea-level to 18,000 feet above this datum; its climate affected by these elevations, and by a range of 18 degrees of latitude. Twelve hundred miles is the distance traversed in passing south from Juarez, on the northern boundary, to the Mexican capital; and, to reach the southeastern boundary, 900 miles more must be covered.

To the coast line of 1,700 miles along the Gulf of Mexico and the Caribbean Sea is to be added 4,000 miles along the Pacific Ocean and Gulf of California.

MEXICO IS AS LARGE AS GREAT BRITAIN AND IRELAND, FRANCE, GERMANY, AND AUSTRIA-HUNGARY COMBINED

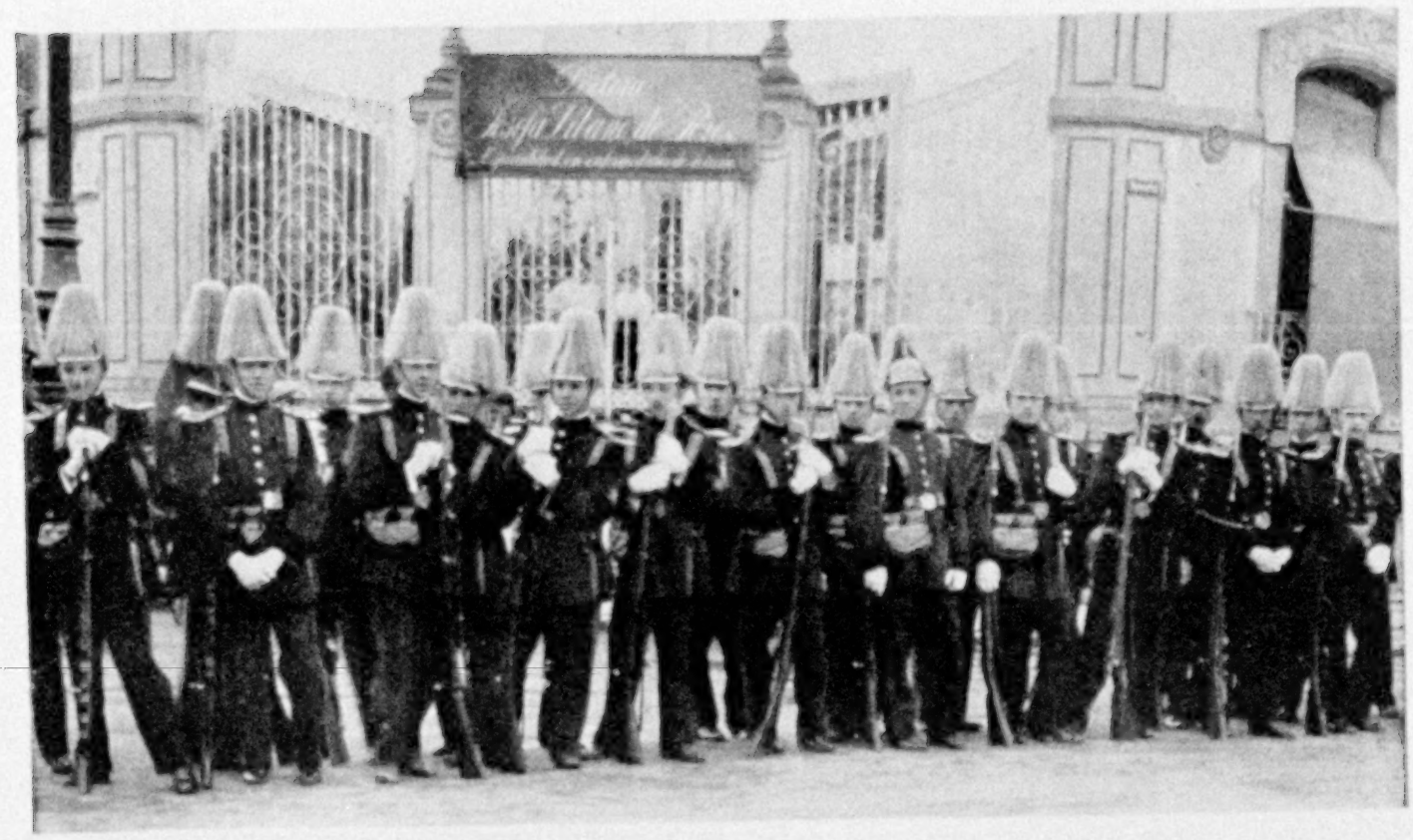
Prior to 1836, Mexico, as a Spanish colony, and the United States covered approximately equal areas of North America, but the Texas secession and the result of the Mexican War added nearly a million square miles to our territory, and the extent of Mexico now is less than one-fourth that of continental United States. But our neighbor Republic still has territorial expanse equal to the aggregate of Austria-Hungary, Germany, France, Great Britain, and Ireland.

The total area of the Republic of Mexico (767,000 square miles) is less than that of our five largest States—Texas, California, Montana, New Mexico, and Arizona—combined, all of these except Montana having been a part of New Spain 75 years ago. None of the 31 political subdivisions of our neighbor are as large as either of the five States named, but four Mexican States contiguous to the United States aggregate an extent greater than that of Texas. Chihuahua, the largest Mexican State, approximates in area (87,000 square miles) that of Utah, Sonora (77,000 square miles) of Nebraska, Coahuila (63,000 square miles) of Georgia, and Durango (40,000 square miles) of Kentucky. Nine subdivisions of the United States (excluding Alaska) are larger than Chihuahua, 15 of greater magnitude than Sonora, and 32 larger than Durango. The rugged and desert character of the Mexican border States support sparse populations, except where mining exploitation and cities resulting therefrom have concentrated settlement.



CAVALRY FROM THE MILITARY SCHOOL (THE WEST POINT OF MEXICO)

Scene in Mexico City during the celebration of the one hundredth anniversary of Mexico's independence, September, 1910



CADETS OF THE MILITARY SCHOOL (THE WEST POINT OF MEXICO)

A section of the Castle of Chapultepec (three miles from the Cathedral of Mexico) is occupied by the President for a portion of the year; but the major portion is devoted to a national military school. The valor of the cadets of this school when defending Chapultepec against the American army is historical.

CADETS OF THE NAVAL SCHOOL (THE ANNAPOLIS OF MEXICO)

While Mexico has an extensive coast-line to protect, its naval equipment is small

CARRIAGE IN THE BATTLE OF FLOWERS, CITY OF MEXICO, MAY, 1910, DECORATED IN RED, WHITE, AND GREEN, THE NATIONAL COLORS

Prominent Mexicans vie with each other in the floral ornamentation of their automobiles and carriages, and in the latter part of the day the congestion of vehicles demands slow movement and gives opportunity for friends in passing to bombard one another with flowers.

The mountainous ridge with limited littorals, which as a narrow peninsula extends southward about 750 miles from the United States boundary and separates the Gulf of California from the Pacific Ocean, is not a State, but is recognized as the territory of Baja California, which in area (58,000 square miles) closely approximates that of Florida. The Gulf of California and the shifting Colorado River practically isolate Baja California from the balance of the Republic and prevent overland communication with it. Tepic, on the Pacific coast (11,000 square miles), smaller than Maryland, and Quintana Roo, adjoining Yucatan, are other territories.

The average density of population in the Republic approximates 20 per square mile, the most thickly inhabited portions (outside of the Federal district) being the States of Tlaxcala and Mexico; the former (1,500 square miles) the smallest of the Mexican subdivisions (less than Delaware in size and of about the same density of population), the latter (8,900 square miles) being nearly as large as New Hampshire, but with more than twice the number of inhabitants.

The Federal district, modeled after the District of Columbia, but of eight times greater area, is surrounded by the State of Mexico, the large population of the capital (470,000) materially aiding in bringing the average to more than 1,200 per square mile.

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, CITY OF MEXICO: COST, $100,000

It is equipped with library, reading-room, class-rooms, gymnasium, swimming-pool, restaurant, and some 90 dormitory-rooms

THE INTERNATIONAL BOUNDARY

The melting snows from the San Juan and Sangre de Christo ranges of the Rocky Mountains in southern Colorado form the genesis of the Rio Grande, which, after flowing south through New Mexico, bends southeast at the western extremity of Texas, courses between it and Mexico for a distance equal to that of Saint Louis from New York, and descends in 1,100 miles from an elevation of 4,500 feet to sea-level at the Gulf of Mexico.

Except when in flood, the Rio Grande is apparently an unimportant stream and readily crossed, for the normal flow is well utilized for irrigation in both countries; but it has carved in a part of its course canyons difficult of exploration. The changes wrought by freshets, which shift the channel, demand the attention of an international commission, whose function is to adjust the boundary along the Rio Grande to meet the varying conditions. The uncertainty of this is illustrated by a claim under investigation that a portion of the important city of El Paso, Texas, is Mexican soil. The remaining 700 miles of the international boundary to the west separating our neighbor Republic from New Mexico, Arizona, and California is through an arid desert section, much of which is mountainous. This is not a direct line, but has five changes in alignment, which have been accurately surveyed and established by 258 permanent monuments easily distinguishable.

Allowing for impassable canyons, mountain barriers, etc., probably 1,400 miles of boundary must be under surveillance to prevent smuggling, the passage of contraband articles, or violations of neutrality in emergencies.

Railways in Texas, New Mexico, and Arizona are close to the border, and these transportation avenues unite the two nations at seven points.

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BURDEN-BEARERS, "CARGADERES," ON AVENIDA CINCO DE MAYO, CITY OF MEXICO

Note comparisons with automobile and carriage, and the ropes passing over the forehead, supporting much of the weight. The strength and endurance of the Mexican peon is almost beyond belief (see page 500).

TOPOGRAPHY OF MEXICO

The mountain ranges of southwestern United States continue into Mexico, and that country may be described as a high plateau, inclosed east and west by cordilleras, which approximately parallel the sea-coasts, from which they are separated by relatively narrow littorals.

The country is divided hypsometrically into the "tierra caliente," "tierra templada," and "tierra fria," the first comprising hot lands bordering the Gulf of Mexico, the Caribbean Sea, and the Pacific Ocean; the second forming the main plateau, bounded by the Sierras, whose more elevated portions are the third division. It is these mountain ranges, or offshoots of rugged topography from them, with intervening desert stretches, that have made communication difficult between portions of the Republic and interfered with railroad construction to cross the country transversely.

Among the mountains of Mexico are numerous volcanoes, all extinct or dormant except Colima, near the Pacific coast, which is active. In the central and southern part of the country earthquakes are of sufficient frequency to encourage the maintenance of an elaborate government seismographic laboratory.

The Sierras approach each other near the City of Mexico, and the adjacent States, although largely mountainous, maintain a population whose density is greater than in other portions of the Republic.

These mountains continue eastward, with Popocatepetl, Ixtaccihuatl, Orizaba, and Perote as prominent features, but are so reduced in height at the Isthmus of Tehuantepec that the railroad connects the Pacific Ocean and the Gulf of Mex-

AVENIDA CINCO DE MAYO, CITY OF MEXICO, SHOWING MUTUAL LIFE BUILDING AND THE UNFINISHED NATIONAL THEATER, WITH ALAMEDA GROVE IN BACKGROUND

This avenue extends from the National Theater to the main cathedral

ico in a distance of 192 miles* (but little greater than that from New York to Baltimore), with a summit about 700 feet above sea-level. The importance of this Tehuantepec railroad is emphasized by traffic valued at 70 million dollars, originating in or destined for the United States, carried in 1910, of which 20 million dollars was from Hawaii, mostly sugar, fully 140,000 tons of this commodity being shipped to Philadelphia (see also page 489).

The saving of 1,100 miles of transit and the enormous expenditures made for modern docks and equipment to facilitate handling freight, is Mexico's claim for preference over the Panama route.

THE HISTORY OF MEXICO

During nearly 300 years subsequent to the conquest by Cortés, Spain dominated Mexico, introducing arts—mainly, however, in connection with church architecture and embellishment—aqueducts, and bridges, and provided education, limited practically to the clergy or those preparing for clerical duties. Industries, except mining or such as produced material to enrich the Crown, were generally discouraged, and attempts by Mexicans to raise or manufacture anything produced in Spain were repressed.

A country whose resources had been improperly developed, in fact retarded; whose people had been impoverished to support a government in which they had no interest or part, and to construct and maintain a multitude of elaborate churches and allied institutions, and who had no experience in self-government, was in a poor position to become independent.

But the Spanish yoke was so burdensome, the enthralment of the Mexicans so oppressive, the poverty of the people so pronounced, and the resultant wealth of the church so great, that a century ago a bold effort for freedom was started, which, after many vicissitudes

* The Isthmus of Tehuantepec was discussed in the NATIONAL GEOGRAPHIC MAGAZINE of December, 1910.

DRAINAGE CANAL AT ENTRANCE TO TUNNEL, VALLEY OF MEXICO

Note the depth of excavation, which was started by peons carrying material on their backs up the steep embankments by means of foot-holes. When this became unprofitable by reason of depth, steam dredges and aërial carriers, using coal costing $10 per ton, were utilized. The photograph shows peons carrying up the slope material for repair. The drainage system covers 50 miles, of which 30 miles are in excavated canal and 6 miles in tunnel.

and numerous revolutions, has become the Republic of Mexico of today.

The battle of Lexington preceded by 14 years the establishment of a definite government for the United States, with an elective President; and, although Mexico reckons its independence from 1810, this was merely the date when the priest Hidalgo struck the spark which started the patriotic flame resulting in Spain being driven from power; for 12 years elapsed before Mexico's initial home government was established with Iturbide as Emperor.

At that time Mexico claimed dominion over an area exceeded only by those of Russia and China, for it included Guatemala (subsequently separated), Texas,

and all the territory north of the Rio Grande ceded to the United States by the treaty of Guadalupe Hidalgo and by the Gadsden purchase.

Iturbide held the throne for less than a year, abdicated, fled the country, to return and be executed as a traitor, and there followed a series of revolutions, each aimed to elevate to power some one who was soon assailed by equally ambitious competitors, for most Mexican revolutions have resulted rather from personal ambition than devotion to a principle.

A SUCCESSION OF REVOLUTIONS

More than half of the first century of Mexican independence was abortive, one coterie after another coming into temporary power, and a number of those acclaimed as rulers, after brief régimes, met ignominious death at the hands of the people they sought to govern.

Revolution succeeding revolution, some of national importance, others local emeutes, developed unsafe conditions for person and property and encouraged brigandage throughout much of the nation.

The effort to establish a monarchy under a European protectorate, while the United States was engaged in civil war, failed after three years, during which Maximilian scintillated in the glory of Emperor of Mexico; but this injection of outside influence into home quarrels undoubtedly hastened the time when Mexico took her place among the nations of the world. Having been accustomed to centralized power, a strong government seemed essential, by reason of former conditions and by the large proportion of the people considered as incapable of performing their functions as citizens.

A nation which had combated foreign foes and passed through many internal conflicts naturally relied to a great extent upon the military arm, and most of those who have directed or now control the affairs of Mexico have held army commissions. The standing army enrollment is about one to every 500 inhabitants.

FORM OF GOVERNMENT

The form of government adopted by Mexico follows in general that of the United States, having executive, judicial, and legislative divisions, and each of the 27 States is represented in two houses of Congress, composed of Senators and Deputies. Congress holds two sessions each year for limited periods, but maintains an organization to act in emergency as advisory to the Executive and to plan the work of Congress between sessions.

Each State has its governor and legislature, and is subdivided into districts (or counties), over each of which a "jefe politico" is placed, the districts having subsidiary municipalities with magistrates, presiding officials, and councils.

The autocratic feature of the Mexican government which is so much protested may be largely due to the fact that governors of the various States hold office with the approval of the President; that jefe politicos of districts have similar relations to the governors of the States, and that the officers of the municipalities are generally controlled by the jefe politicos.

Successive re-elections of President Diaz have limited the number of changes in officials, some of whom have abused their powers to an extent which has caused emphatic expressions of dissatisfaction.

This condition existing in a republic may appear startling, yet it is not very different from the control exercised over portions of our own country, the variation being that in the United States many dominate by self-appointment or by the indifference of citizens, while in Mexico such have practically official endorsement and recognition and consequent responsibility.

The Mexican constitution prohibits slavery, acknowledges the citizenship of all native Mexicans and those born of Mexican parentage, and of naturalized foreigners who bear no allegiance to other nations. In practice the right of suffrage is limited and may be expected to remain so while a considerable por-

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tion of the inhabitants are uneducated, many speaking only remnants of ancient dialects, for the votes of such will naturally be dictated by the local "curé" or the "jefe politico."

Among the reforms demanded by intelligent Mexicans are greater liberality in matters of franchise, the abolition of punishment for purely political offences, and modifications in the treatment of untried prisoners.

Education is made compulsory, a million scholars being reported as attending preparatory schools; for, although in remote sections this education has more form than substance, there has been marked progress in this important acquirement for a self-governing people; and, as education advances, drastic measures unfamiliar to those residing north of the Rio Grande may be found unnecessary. Advanced studies are prosecuted in colleges by probably 10,000 students, and Mexicans are enrolled in many foreign universities.

The divorcement of church and state, carried out under Juarez, confiscated churches, monasteries, and nunneries, and prohibited religious processions and the wearing of distinctive ecclesiastical robes upon the streets or roads; but in remote sections there is evident laxity in the enforcement of these provisions. The method of worship, too, is not in accord with our appreciation of that of the Church of Rome, for the superstition and idolatry of the ancient Mexicans seems to maintain; fireworks, tinsel, gaudy dolls, and pictures being substituted for the crude forms carved from stone.

The church and state are independent, and Congress cannot pass laws prohibiting or establishing any religion. Hence, although the Catholic religion is accepted as that of the people, there is toleration of other creeds, and in many portions of the Republic flourishing Protestant missions exist, while in the capital a Young Men's Christian Association building costing over $100,000 was dedicated as a feature of the centennial celebration in September, 1910.

THE MEXICAN PEOPLE

Of the 16 million inhabitants, two-fifths claim direct descent from ancient tribes or families which are accepted as the basis of Mexican history, two-fifths are of mixed native and foreign blood, the remainder being classed under the common appellation of "foreign."

Throughout much of the country, and often within short distances of railroads, are remnants of some of the ancient native tribes or races, adhering to customs, methods, and speech of their ancestors.

Thus in Oaxaca are the Zapotecas and Mixtecas, the estimate for the two races being a half million, and a government publication mentions a dozen other families in the same State.

In Hidalgo and adjacent States, the Otomis; in Puebla and Oaxaca, the Mexicanos; the predominating Mayas in Yucatan; in Michoacan and Jalisco, the Tarascans, and the Tlaxcalans, in their native State, and other groups elsewhere, still maintain the tribal individualities.

Although Spanish is the language of the country, and much English is spoken in the regions most visited, a large number of the natives use only the vernacular.

Prescott refers to the Aztecs, Tlaxcalans, and others as producers of delicate fabrics, colored by vegetable dyes; intricate designs in the precious metals, and beautiful decorations made of feathers; numerous ruins also indicate marvelous skill of ancient peoples in stone-work, especially as the tools used were obsidian or copper.

Evidences that this deftness in handiwork has been retained appears in the feather-work, wood-carving, stone-cutting, etc., of the present day. The beautiful pottery and unique weaves of serapes, made with the crudest appliances, and excellent fabrications in cast or wrought iron, filagree silver, etc., also bear testimony to the skill of the Mexican Indian.*

*In the NATIONAL GEOGRAPHIC MAGAZINE for March, illustrations of some miniature dolls exhibit this deftness; and to these may be added the toy baskets and pottery, microscopic reproductions of the larger but excellent productions of the natives.

PEONS CARRYING ORE OUT OF A MINE

While this arduous labor continues in some mines, others are equipped with modern economical hoisting and pumping machinery

The Mexican people are decidedly democratic, living under a republican form of government generally accepted as autocratically administered. Prominent national characteristics, met with practically everywhere, are courtesy and politeness, evident equally to foreigners and among the people, independent of social condition.

The history of Mexico, engrossing whether considered as founded on substantial testimony or tempered by romance; the country's record of mineral wealth; its variety of soil products; the habits and customs of its people, many of them strange to visitors, must be passed in hurried review.

A COUNTRY OF EXTREMES (SEE ALSO PAGE 500)

Mexico may be described as a land of surprises, a country of extremes, a nation of contrasts, a domain of apparent contradictions; where the old and the new, the poor and the rich, the crude and the refined, are near neighbors; where the sleep of centuries often continues adjacent to present activities, and where ultra conservatism is elbowed by pronounced evidences of modern progress. Space will permit mentioning but few of the surprises—of conditions influenced by extremes of altitude, temperature, or rainfall; of contrasts of product, people, methods, environment, and development,

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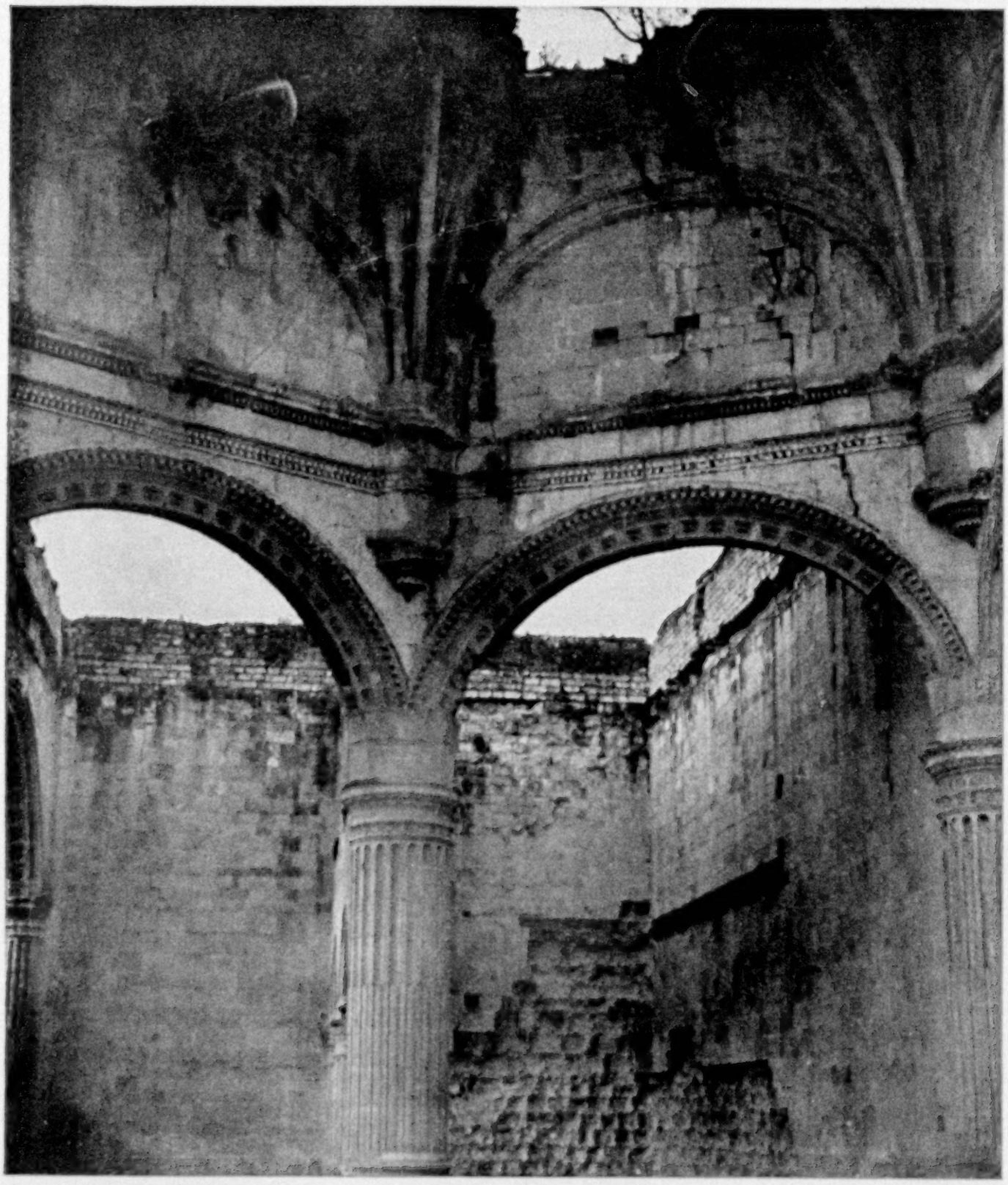


UNFINISHED CATHEDRAL AT TEPOSCOLULA, OAXACA

Note the excellent stone masonry, the columns being divided vertically and horizontally to facilitate carrying the sections as they had been transported many miles on the backs of animals.

and of the contradictory charm created by these.

In contrasting the governments and peoples of the United States and Mexico, we must consider that in the one case claimants for religious freedom sought a country where this could be and has been enjoyed, while in the other the na-

OLD CHURCH IN WESTERN OAXACA

Note the absence of adjacent habitations and bells in the tower

tives were enslaved by foreign expeditions of doubtful authority and kept in bondage for three centuries.

The United States owes its development to colonies of God-fearing homeseekers, prepared to win the products of the soil by hard work, while greed for wealth and renown, coupled with a fanatic zeal for a religion whose precepts he apparently failed to personally apply, encouraged Cortés in his conquest of Mexico.

Whether we accept Prescott's remarkable narrative or his critics' contentions, the skill, diplomacy, and courage of Cortés and his followers must be admitted, their shrewdness and persistence admired, their duplicity and cruelty condemned.

The story of the conquest of Mexico may be overdrawn, the odds against which the Conquistadores fought magnified, the victories made too lurid, and the defeats minimized; but the fact remains that multitudes of the Aztecs and other tribes were vanquished by a relatively small Spanish force.

Whether the status of civilization generally accepted was as advanced as claimed should not lessen appreciation of the fact that Cortés found a people superior to those who 25 to 30 years before met the early discoverers of North America.

An interesting feature of the celebration in September, 1910, of the centenary of Mexico's independence was a representation of types of the people who populated Mexico at the time of the Conquest; but these were not the oldest inhabitants of which there is record.

ANCIENT RUINS ABOUND

Mexico has a wealth of archeological relics, remnants of an ancient civilization of which no well-defined trace exists. Volumes have been written to demonstrate that the builders of what are now ruins were of Mongolian, Semitic, or Phœnician origin, but the riddle cannot

PATH IN CHAPULTEPEC PARK, SHOWING CYPRESS (SABINO) TREES

This cypress grove surrounds the Castle of Chapultepec and abounds in picturesque walks and well-kept drives. In the afternoons of Sundays and feast days these drives are crowded with vehicles and equestrians.

be admitted as solved. All authorities, however, unite in praise of the magnitude and the perfection of workmanship shown at various ruins found throughout the Mexican territory. The region adjacent to some of these raises question as to the source of sustenance for multitudes which must have then existed, and causes speculation upon ethnologic if not physiographic changes which may have occurred in the interval.

Prominent among these ruins are Uxmal and Chichen-Itza, in the State of Yucatan; Palenque, in the State of Chiapas; Mitla,* in the State of Oaxaca, and Xochicalco, in the State of Morelos.

The pyramid of Cholula, in Puebla, and those of the Sun and Moon, in the State of Mexico, have also been liberally described, but distributed over wide areas are many other ruins which have had but little or no investigation, and rock sculptures, images, idols, and ancient pottery, found in numerous localities, are the only records of peoples whose history is unknown and whose names even are lost.

TO MEXICO BY WATER AND RAIL

The facility with which Mexico can be reached by all-rail routes encourages a considerable majority of visitors from the United States to use them, but the regular lines of vessels plying between the ports of our country and Europe and Mexico are liberally patronized.

The steamship route from New York to Vera Cruz, after rounding the Florida keys, varies little from a straight southwest line, as the calls at Havana, Cuba, and Progreso, Yucatan, are not divergences. (The longitudes of Havana and Columbus, Ohio; of Progreso and Springfield, Illinois; of Vera Cruz and Dallas, Texas, or Emporia, Kansas; of Mexico City and Kearney, Nebraska, correspond closely.) The State of Yucatan, the thumb of Mexico, separating the Gulf of Mexico and the Caribbean Sea, is chiefly a low, flat country, a calcareous base covered with a limited earthy layer, renowned for its production of sisal fiber (nearly the entire output of the country being grown in Yucatan) and for archeological ruins.

The capital, Merida, a well-built city, having paved streets, sewage, water supply, and electric lights, lies less than 30 miles inland from Progreso, with which it connects by a railroad. Remnants of an ancient stone-encased mound, a cathedral about 400 years old, and water caverns in the limestone, are features of interest. Earth sufficient to support vegetation in the plaza and in patios of dwellings had to be brought 20 miles, as the lime rock is close to the surface.

The present site of Vera Cruz is not that originally selected by Cortés, and its harbor improvements have materially advanced the port. Although buzzards are still protected as allies of the board of health, sanitation has done much to reduce the danger from "vomito."

The City of Mexico, 264 miles (by rail) west of Vera Cruz, and 7,400 feet altitude, is reached by two rail routes, climbing from the hot lands through difficult mountain passes, one of which follows closely the trail taken by Cortés in 1519, by Gen. Winfield Scott with American troops in 1847, and over which, 15 years later, the invading French troops passed.

The topography in 75 miles jumps from sea-level to the snow-capped summit of Orizaba, nearly 18,000 feet above that datum, the climate varying from perpetual summer of the torrid zone to perennial snows on Orizaba, Popocatepetl, its neighbor Ixtaccihuati, and other mountains (see also page 481).

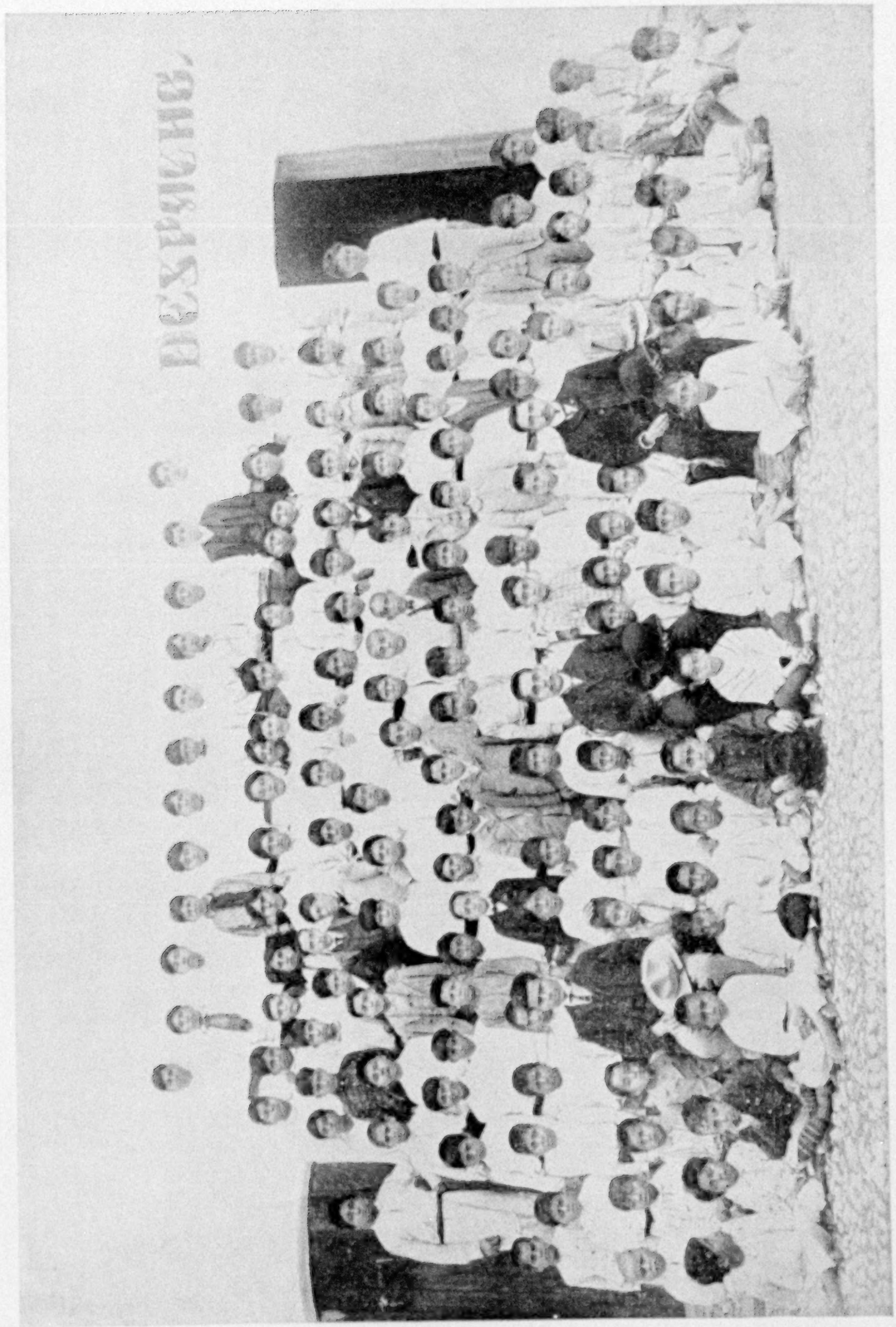
CENTERS OF POPULATION

The settlement of Mexico is mainly in the central region, where two-thirds of the population inhabit one-quarter of the total area of the Republic. The capital is the most populous city, Puebla to the east and Guadalajara to the west of

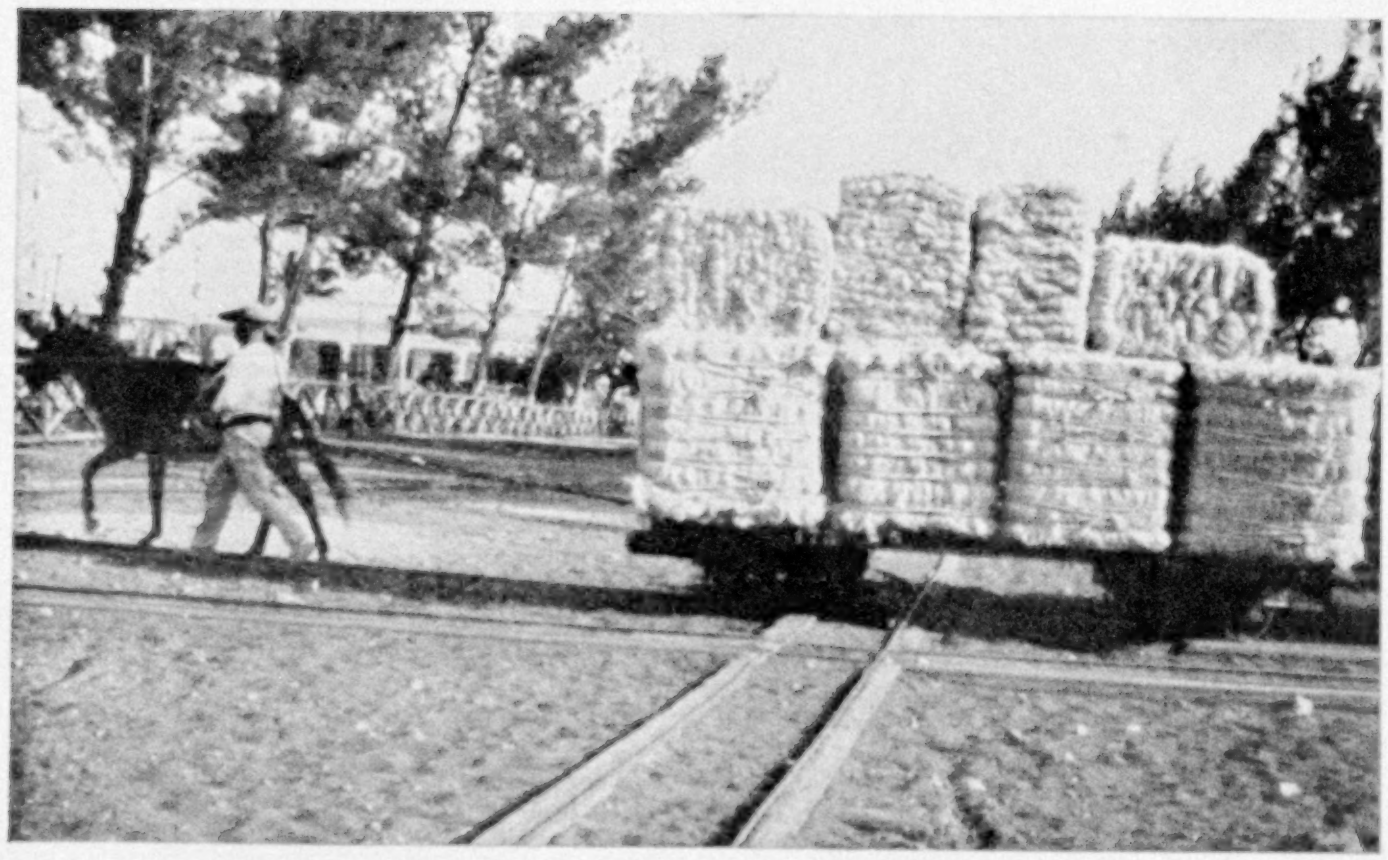
* The NATIONAL GEOGRAPHIC MAGAZINE for December, 1910, contains a suite of excellent illustrations of the Mitla ruins, the pyramid of the Sun and Moon, at San Juan Teotihuacan, and the Aztec Calendar Stone.

GIRLS IN PUBLIC SCHOOL: CITY OF TLAXIACO, OAXACA

A city of 8,000 inhabitants, located 85 miles from railroad and accessible by horse trail. The elevation of the city is about 7,000 feet above tide



BOYS IN PUBLIC SCHOOL, CITY OF TLAXIACO, OAXACA, A PROMINENT MUNICIPALITY IN THE COUNTRY OF THE MIXTECAS, WHO TRACE THEIR ANCESTRY TO THE THIRTEENTH CENTURY



MULE HAULING HENEQUEN FIBER: PROGRESO, YUCATAN

This is a product of an agave plant grown in large quantities in Yucatan, the bulk being shipped to the United States as a substitute for hemp in many specialties of manufacture.

the capital each claiming second place, with approximately 100,000 inhabitants. Monterey, with its growing industries; San Luis Potosi and Leon exceed 60,000 inhabitants. Other important cities—Guanajuato, Zacatecas, Pachuca, Chihuahua, Parral, Durango, Oaxaca—have developed from mining enterprises, while industries and agriculture are responsible for the growth of Merida, Aguas Calientes, Celaya, Irapuato, Torreon, Jalapa, Queretaro, Orizaba, Morelia, Saltillo, Hermosillo, Colima, and Toluca.

The more important ports are Vera Cruz, Tampico, and Puerto Mexico, on the Gulf of Mexico; Acapulco, Mazatlan, Manzanillo, and Salina Cruz, on the Pacific Ocean, and Guaymas and La Paz, on the Gulf of California.

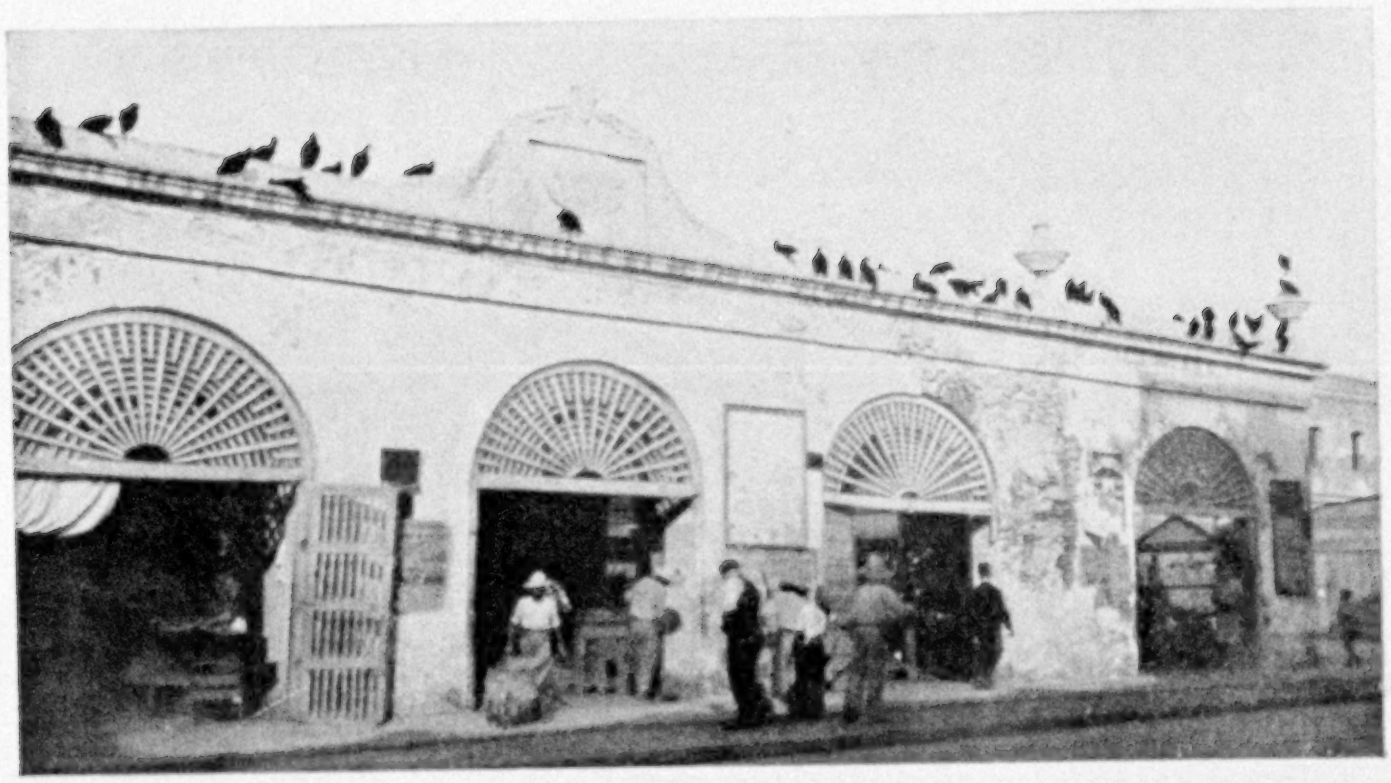
Other localities maintain considerable coastal trade by using lighters plying between the shore and vessels in roadsteads, and some apparently favorable sites await projected railroad connections to encourage harbor improvements.

These numerous cities offer many attractive views, their ornate churches, handsome plazas, and industries each presenting features of interest. The mountains also are rich in scenic and impressive characteristics, and the types of people instructive.

WELL COVERED WITH RAILROADS

The bonds of steel, represented by 15,000 miles of railroad, constructed within the last 30 years—of which 55 per cent is owned or controlled by the government—have done much to unite the various portions of Mexico, but there is necessity for transcontinental lines crossing the Sierras, or connecting settlements along or near the northern border, where the country has its greatest width.

Of railroad mileage within the borders of the country, approximately one-half is between sea-level and 5,000 feet elevation, and about an equal amount between 5,000 and 10,000 feet. Few important cities are at lower elevation than 4,000 feet, and they range from this to 9,000 feet above sea-level, the most noted exceptions being the city of Monterey,



BUZZARDS ON MARKET-HOUSE: VERA CRUZ

These birds are the scavengers of offal about the streets, and as such are protected, although with the improved sanitary facilities their services are less essential than formerly

1,600 feet elevation, and the seaports or municipalities adjacent thereto. The governmental control of main transportation routes and of telegraph systems is a step taken with the expectation of keeping public utilities free from extraneous influences.

THE RIVERS OFFER MAGNIFICENT WATER POWER

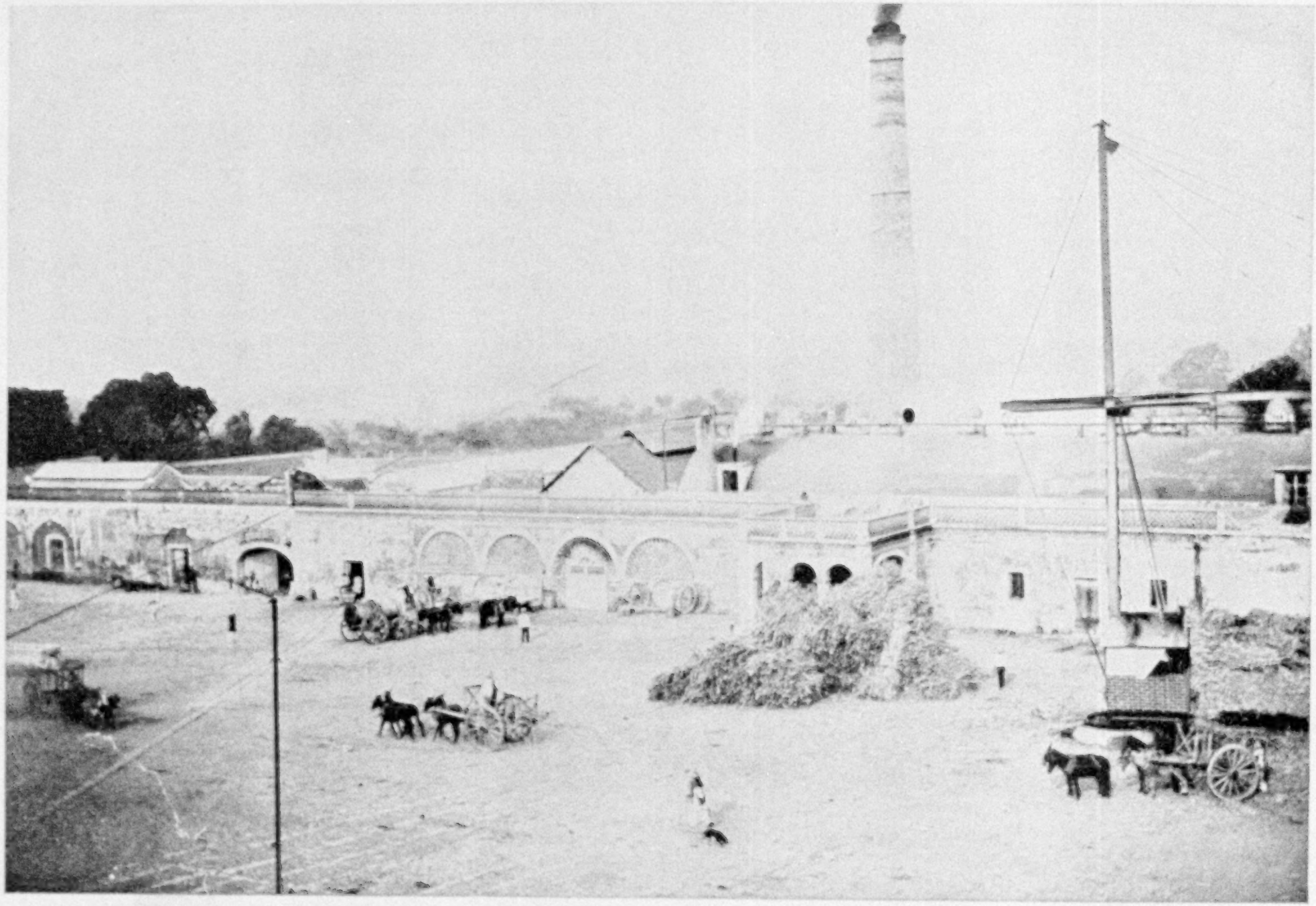
The topographic conditions offer some excellent opportunities for the development of streams normally of small volume but with abrupt drops, forming important water powers operating under high heads, of which advantage has been taken, and on some of the prominent rivers the descent is sufficiently rapid to encourage the utilization of large volumes with relatively low fall.

Many stream-beds are dry "arroyas," or "barrancas," except during brief intervals, when flood conditions temporarily transform these into rushing torrents, while the discharges of other rivers are fairly maintained throughout the year, and most water-courses have formed rugged canyons in the rocks or deep gashes in the alluvial plains. The number of important rivers is limited, and the rapid descent from the mountains to the coast permits navigation upon but few.

Throughout much of Mexico irrigation, which is liberally applied, is essential to assure satisfactory crops, and the extension of artificial watering is receiving attention.

The quantity and distribution of rain varies greatly throughout the Republic, the annual precipitation ranging from a few inches in the northwestern section to the total of 13 feet or more stated to occur on the Isthmus of Tehuantepec. In the northern desert regions many months may pass with little if any rainfall, or there may occur phenomenal downpours, such as reported at Monterey in 1909, when over 34 inches were registered in 140 hours. Records covering more than 30 years give the rainfall in the valley of Mexico, in which the capital is located, at from 13 to 36 inches annually, the bulk of which fell in June, July, August, and September.

But the valley of Mexico, 7,400 feet above sea-level, encircled by mountain chains rising 1,500 to 5,000 feet higher, with the snow-covered extinct volcanoes within 50 miles, has climatic conditions differing from that of other sections.



A TYPICAL SUGAR HACIENDA: STATE OF MORELOS, MEXICO

Note piles of sugar-cane, which have been brought in by the mule teams and are then handled by power derricks

BUILDINGS OF HACIENDA ATLACOMULCO, CUERNAVACA, MEXICO, BUILT BY CORTÉS AND STILL OWNED BY CORTÉS' ESTATE

This hacienda supported the first hospital built on the American Continent

THERE ARE FEW SOIL PRODUCTS WHICH CANNOT FLOURISH IN MEXICO

The Mexican flora include cacti of the desert,* varieties of fiber plants, wheat and maize of the temperate zone, cotton (which is indigenous), sugar, rice, coffee, vanilla, spices, medicinal plants and luxuriant tropical growths, citrus fruits, and berries, with flowers and orchids in endless variety. The variety of fruits and vegetables covers practically the list of other lands, due to the influence of topography and geographical location.

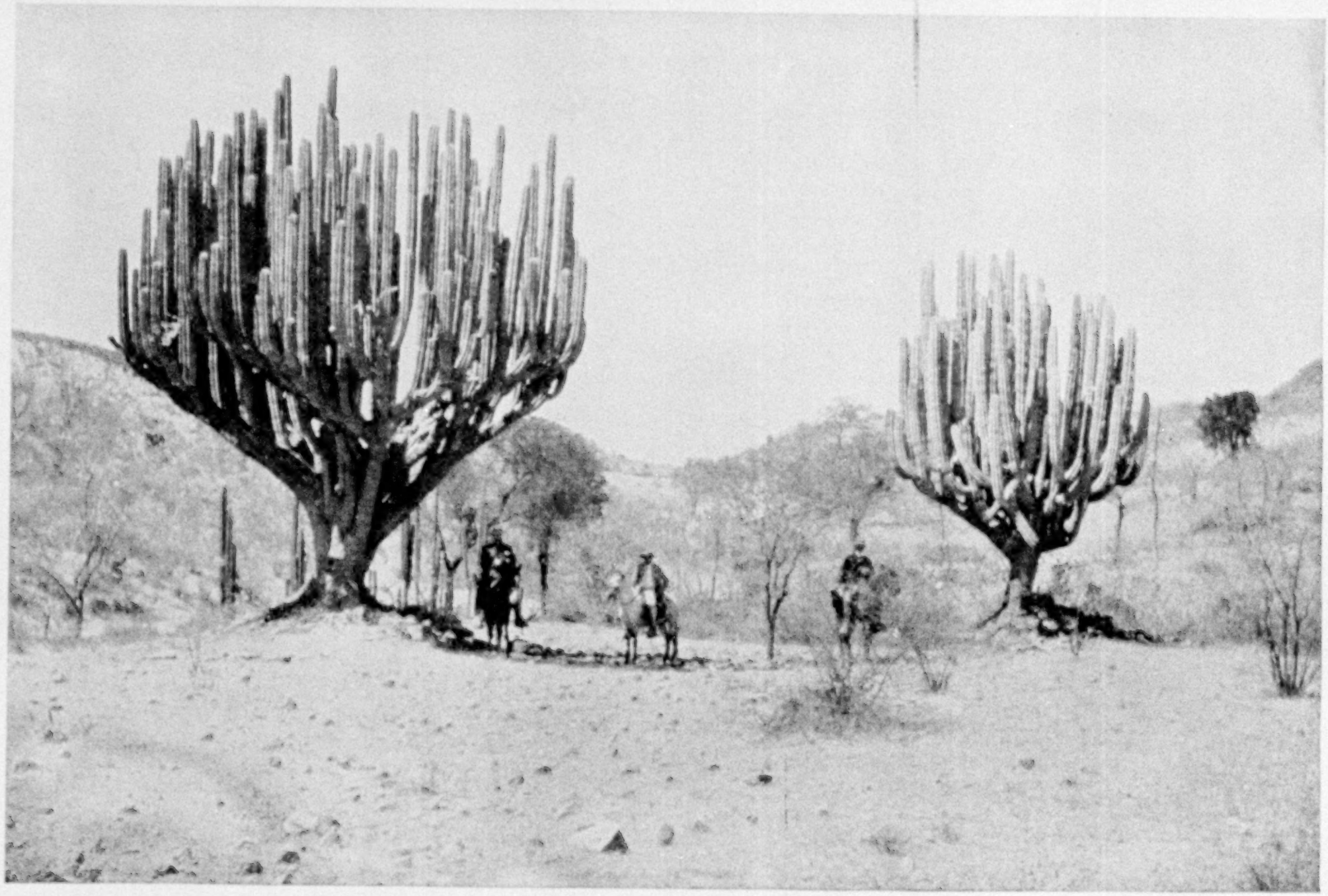
The vegetable products and the cattle raised in Mexico exceed in value 200 million dollars annually. The former includes corn (50 million dollars) and beans (6 million dollars), the popular foods of the country, all of which are used within its borders; wheat (13 million dollars), which is augmented by large importations; sugar and its products (13 million dollars), insufficient for the demands of the country; cotton (17 million dollars), representing but about one-half of the nation's consumption; coffee (8 million dollars), part of which is exported; henequen, the sisal hemp of commerce, most of which is shipped to the United States (16 million dollars); while other fiber plants add 2 million dollars to the country's exports. The tobacco crop is large, supporting, it is claimed, 600 factories.

The annual export of rubber from Mexico is valued at 13 million dollars, of which practically two-thirds is obtained from the rubber trees of the hot country and one-third from the shrub "guayule," which flourishes upon the desert plains of the great plateau.

The beverages used by the people, made from aguave plants and from cereals, are estimated at 10 million dollars per annum.

Upon the plains and among mountains sheep and goats in large numbers are

* The NATIONAL GEOGRAPHIC MAGAZINE for August, 1910, presented illustrations of some of the enormous cactus growths which are found in the desert lands and occur in many portions of Mexico.



CANDELABRA ORGAN CACTUS IN SOUTHERN PUEBLA

Note size of plant compared to horsemen. Others even larger exist in the vicinity. The view was taken on a well-used trail

herded, the wool-clip being utilized locally for the production of serapes, rebosas, and sombreros, the hides tanned, and the meat consumed by the inhabitants. The individuality of design in serapes or blankets, like the color or forms of pottery, indicates the section of Mexico in which they are produced.

The forest products of the highlands embrace oaks, pines, palo-blanco (cottonwood), mesquite, and huisache, while the hot country supplies dye-woods, ebony, mahogany, and other hard woods valued at 5 million dollars annually. Dependence for centuries upon wood, or charcoal made from wood, as the source of fuel, has denuded much of the territory convenient to the more densely populated sections, and the timber demand for railways has also influenced the available forest area. But some mountain districts are well timbered and the government has inaugurated a systematic study of forestry.

There are few soil products which do not flourish or that could not be grown in Mexico, and the variety now obtained would be greater if closer attention were paid to cultivation and had not the growth of some important staples been prohibited while Spain ruled the country under its repressive colonial policy.

Mexico's foreign trade in 1910 exceeded 225 million dollars, nearly 130 million dollars representing exports, of which three-fourths were to the United States, Great Britain ranking second.

Of 95 million dollars in imports for the same fiscal year, three-fifths were from the United States, including boots, shoes, chemicals, machinery, coal, coke, cereals, mineral oil (although large deposits have recently been opened in Mexico along the Gulf), building woods, cotton in yarn, goods and manufactures, railway materials, and fabrications of iron, paper, etc.

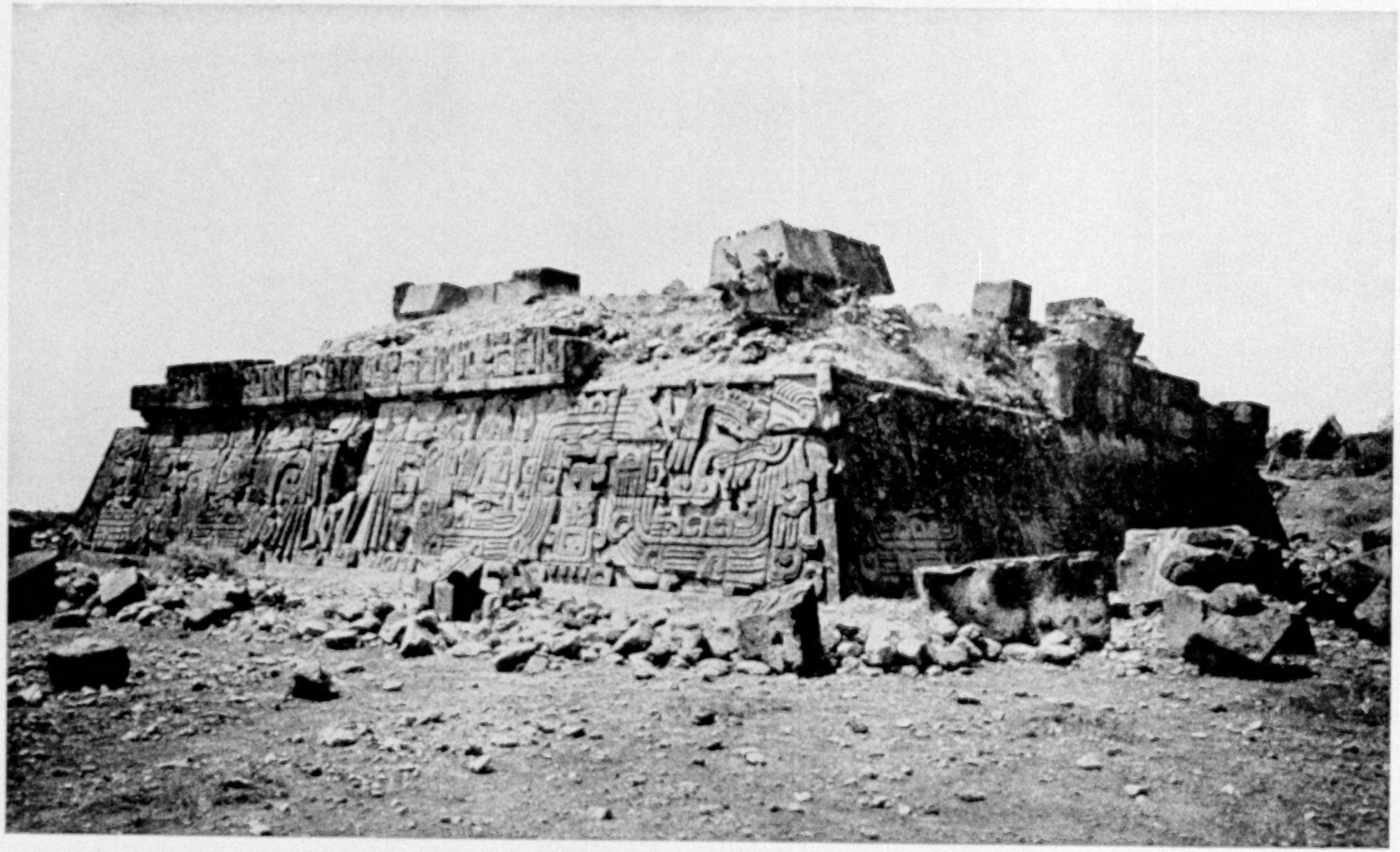
MEXICO LEADS THE WORLD IN PRODUCING SILVER

Mexico is pre-eminently *the* silver country, leading the world in producing "white metal" to the amount of 40 million dollars annually. Its output of copper, valued at 13 million dollars, is second to that of the United States, and, in the production of 3½ million dollars' worth of lead, it follows that country and Spain. Gold, mercury, tin, antimony, bismuth, iron, marbles, and sandstones are also mined, and the country possesses fields of mineral oil and valuable deposits of coal.

The coal mines in the State of Coahuila produce 1½ million tons of fuel per year, much of the coal being coked for the Monterey Iron and Steel Works and for silver smelters. About an equal amount of foreign fuel is imported, and late explorations have developed large quantities of satisfactory coal in the State of Oaxaca.

Among the famed Mexican deposits of precious minerals whose names promoters delight to conjure with are Santa Eulalia, Batopilas, Sombrete, Zacatecas, Cananea, Catorce, San Luis Potosi, Guanajuato, Pachuca, Real del Monte, El Oro, Taxco, and Oaxaca, interest in the history of some of these being stimulated by the wondrous tales of pavements of silver ingots, magnificent cathedrals built, and munificent gifts or loans to rulers by mine owners or operators.

In some of the Mexican mines, notched tree trunks still serve as ladders, and oxhides raised to the surface by animals operating "malacates" are used for drainage. In others the highest types of economic mining and pumping equipment have been installed at great expense, and improved methods of crushing and treating the ore, including vanners, tables, lixiviation, have displaced "arrastras" and the "patio," familiar features in Spanish methods of extracting the precious metals. Mules dragged heavy boulders around on a prepared bed of stones to crush the ore to a powdered sludge in "arrastras," and other mules or horses were driven about for weeks in patios over large masses of this sludge, to which copperas, salt, and mercury were added, so as to form an amalgam, which was recovered by washing.



RUINS OF XOCHICALCO, IN MORELOS

Note the carved stones, evidences of the handiwerk of people whose identity is lost in the remote past (see also page 487)

A MOUNTAIN OF ORE

Iron ores are found in large quantity in many portions of the Republic, some deposits being of phenomenal proportions, as the Cerro de Mercado, just without the city of Durango, concerning which much that has been written as to it being a meteorite or a mass of metal must be qualified.

My initial visit to Mexico in 1882 was to examine and report upon this "mountain of iron ore," for such it is, and subsequent familiarity with the important producers of this mineral elsewhere give no reason to change the statement then made that "the Cerro de Mercado is the largest deposit of ore exposed above ground of which I have knowledge." The mineral is of non-Bessemer grade, approximating an average yield of 60 per cent of metallic content, and is employed in making iron as well as for flux in silver smelters.

Notwithstanding the abundance of excellent ores from which to produce iron, this metal may rank in cost close to others upon which we place higher values; and a feature of market days throughout much of the Republic is the iron merchant, who has spread on the pavement a heterogeneous display of old spikes, nails, keys, locks, and odd pieces of iron; for the average daily wage rate of the peon, equivalent to from 25 to 40 cents gold, will equal the cost of only a few pounds of scrap iron.

The domestic production of iron and steel, which falls far short of Mexico's requirement, is supplemented by liberal importations from the United States and Europe (the annual imports, exclusive of machinery, averaging 10 million dollars), but the processes used in Mexico cover the range from the crude Catalan forge to the modern blast furnace and steel works.

In the mountains of Oaxaca and adjacent States "ferrerias" produce from 25 to 50 tons of "platina" each per annum, by treating iron ore in an open charcoal fire, supplied with blast by a "trompe," the resulting "blooms" being wrought under helve hammers operated by water wheels. The fuel and ore are brought to and the metals taken from these ferrerias on the backs of men or animals. Other plants produce charcoal pig iron in cold or warm blast furnaces, and supply superior merchant bar from rolling mills whose puddling and heating furnaces are wood-fired, or make excellent castings in foundries. Others convert pig iron and scrap iron into steel in open-hearth furnaces, or melt scrap in gas- or oil-fired furnaces, and fabricate the product into various forms.

At Monterey a modern plant costing 5 million dollars has a blast furnace fed with coke, Bessemer converter, open-hearth steel furnaces, and rolling mills, manufacturing structural and merchant steel and rails, etc., amounting to 60,000 tons per year. Eighty-pound steel rails, made in the Monterey plant, are being laid on some Mexican railroads—an important step toward industrial independence.

THE MEXICAN PEON

Opportunity to observe the Mexican peons in cities and in various portions of the Republic, some remote from established avenues of travel, encourages favorable opinion of their ability and expectation of material advancement as education becomes general and ambition is encouraged.

Most writers apply phrases such as "dirty," "lazy," "thieving," to the peon. As a class the peon does not conform to our appreciation of cleanliness, although at every water-course they are observed making individual ablutions or laundering, and the methods of preparing and disposing of food fall short of our accepted standard. It is, however, possible that if we investigated the slums of our cities as tourists visit those of Mexican municipalities, there would be found many practices as offensive.

A lazy man does not travel at a trot, nor assume heavy burdens, nor does he utilize the time when driving a pack-train to add to his little store by braiding a mat or other article from palmetto or aguave leaves.

XUM

A Mexican assigned to a duty, as a rule performs it promptly and with integrity. He handles tools well, but follows precedent, and the uncertainty of action accredited to him is largely traceable to the observance of "fiestas" fixed by church or state, which too often are debauches, due to an abundance of "pulque" or "aguardiente."

Of moderate stature and of light build, he exhibits marvelous strength and endurance, especially as burden-bearer. Living in the land of Mañana, where everything is considered as put off until tomorrow, he moves with speed difficult for a good walker to equal. His quiet demeanor and mild speech give place to wild enthusiasm only at bull-fights, games of pelote, or when the Liberty Bell is sounded on the national anniversary; for the Mexican is a lover of his country, which until lately has done so little for him.

On the mountain, the peon trudging over difficult trails continues weaving a hat, stopping only long enough to doff his "sombrero" with a courteous and evidently cordial *"buenos dias."*

As the civil marriage only is recognized legally, while the Catholic Church demands a religious ceremony, the formalities are often neglected, especially among the poorer classes.

The affection existing between parents and children, the love of flowers and of music, as manifest in the mountains as in the cities, contrasts with the national pastimes of cock-fighting and the bull-ring, and with the evident insensibility to the suffering of dumb creatures, which prevails.

Although some domestic animals are possessed by every peon able to own them, kept close to and often within the homes, bringing about an apparent affection between them and their owners, the latter would seem to show little interest in the suffering caused by long fasts, sharp goads, cruel spurs, or loads which are all the animals can carry, the friction of which is often the cause of sores upon the creature's body.

MANY CONTRASTS AND EXTREMES

Some of the striking contrasts, indicating extremes or contradictions, have been referred to, and others, which also suggest the peoples' democracy, may be of interest (see page 485).

A fashionably dressed gentleman precedes or follows on a prominent street of the capital or other large city a sandaled peon clad in linen trousers and blouse, his indispensable companion, the "serape," over one shoulder and his head protected by a wide-brimmed sombrero.

A passing Indian woman, barefoot and with uncovered head, a child slung in her "rebosa" over her shoulders, suggests intimate association with garlic, onions, and pulque, which is balanced by an atmosphere heavily laden with artificial perfumes, which are features of the toilet of milady on her promenade.

A speeding automobile diverts its course to avoid a drove of sleepy burros laden with lumber, feed, or pottery, or a lumbering traffic wagon moves side by side with lithe "cargadores" carrying on their backs or on litters household goods of every variety.

A gorgeously appointed funeral trolley car, conveying the remains of one whose family can afford this expense, may reach the burial place simultaneously with three or four peons, packing on their shoulders the body of a comrade in a plainly painted coffin, the use of which is rented and which will be returned after the body is given interment.

Riveters joining the skeleton steelwork of a great opera-house look down upon a building near by being altered, the workmen using scaffolding bound together with ropes in lieu of nails or spikes.

One-story and possibly single-room adobe houses plastered in colors adjoin large structures of elaborate architecture; industrial establishments are neighbors to handsome homes, through whose spacious doorways are had glimpses of beautiful patios adorned with flowers and fountains. The wide entrance of a "casa grande" sandwiched

CUITLAHUAC, A YOUNGER BROTHER OF MONTEZUMA, WHO SUCCEEDED THE LATTER AS SOVEREIGN

This and the following illustrations were features of the historical procession of Mexico's centennial celebration in September, 1910, the participants being, as far as possible, descendants of those they represented.

MEXICANO WARRIORS, AS REPRESENTED IN THE HISTORICAL PROCESSION OF THE CELEBRATION OF MEXICO'S CENTENNIAL OF INDEPENDENCE

The costumes and arms are similar to those of the Mexican soldiers who opposed the Spanish conqueror, Cortés, and it is probable that the faces of the men are equally typical

between stores on the street level may give access to luxurious and richly appointed living apartments on the floors above. In one home a course dinner (and the number of courses is great) will be served with the best viands and all the equipments of wealth, while tortillas and frijoles are the staple food of the immediate neighbor.

The light from a single candle may dimly illuminate the smoky interior of an adobe home, while the street outside is ablaze with lights supplied by electric current generated at a modern hydro-electric plant, conveyed at high voltage for 95 miles to operate an excellent system of urban and suburban railroads and supply illumination.

The contrasts are not confined to the cities, but are also pronounced in the open or mountain country.

The "Camino Real" paralleling the railway brings into close association locomotives drawing trains of well-equipped passenger cars, the pack-mule, the heavily laden burro, the clumsy ox-cart with cotton-wood slabs for wheels, and the peon trotting along under burdens apparently out of proportion to his physique.

Far from rail or even wagon roads the whirr of a sewing machine may come from within a cane or mud hut, while the master of the house (if it can be so called) scratches the ground with a crude plow or threshes his grain by driving animals over it.

No extensive journey is necessary to pass from the humble home of a weaver, who with ancient hand-loom fabricates serapes of neat design from wool which he has carded, spun, and dyed by hand, to a splendidly equipped mill of many looms, operated by hydraulic or steam power.

In the sugar-growing country, wooden, stone, or copper rolls operated by animal power extract the saccharine matter from cane and the excess molasses is absorbed by a wad of mud, although a few miles distant an hacienda with the highest type of roller mills, vacuum pans, and centrifugals produces large quantities of sugar of a superior character.

The climate, too, has its extremes, for on the highland one seeks the warmth of the bed early, because of the chill night air, but finds the sunny side of the street too warm in midday. The lowlands have days of intense torrid heat, preceding others when a strong "norther" chills to the bone. Months of drought, during which little if any rain falls, are succeeded by intervals when rain may be expected for a part of every day, the precipitation being so heavy at times as to produce serious loss by freshet conditions.

LARGE ESTATES

Among the problems disturbing Mexico are landed interests controlling enormous areas, some utilized chiefly for grazing or live stock, others for raising sugar-cane, aguave (for the production of pulque), henequen, rubber, etc.

In the sugar country large amounts of capital are invested in buildings to accommodate machinery, much of which is of high character, or for administration, and in many instances elaborate church structures are features of the haciendas. Heavy amounts of Mexican capital are invested in these large estates, in haciendas and industrial establishments; but the claim is made that relief from taxation on large unproductive areas retards Mexico's progress and places unnecessary burdens upon developed properties.

FOREIGN INVESTMENTS

Much of the railroad development, many of the better-equipped mines and large industries are to be credited to foreign expenditures more than to Mexican capital, the United States holding a leading position in these investments; but European countries and Canada have supplied liberal sums, the aggregate of foreign capital being reported as 1,000 million dollars.

In Mexico City there are seven banks chartered by the government, having capitals totaling 35 million dollars, and in most of the States are similar institutions with the privilege of issuing currency that passes at par on a silver basis, which is 50 per cent of gold value.

XUM

DNA. MARINA (MALINTZIN) AND HER RETINUE OF INDIAN LADIES

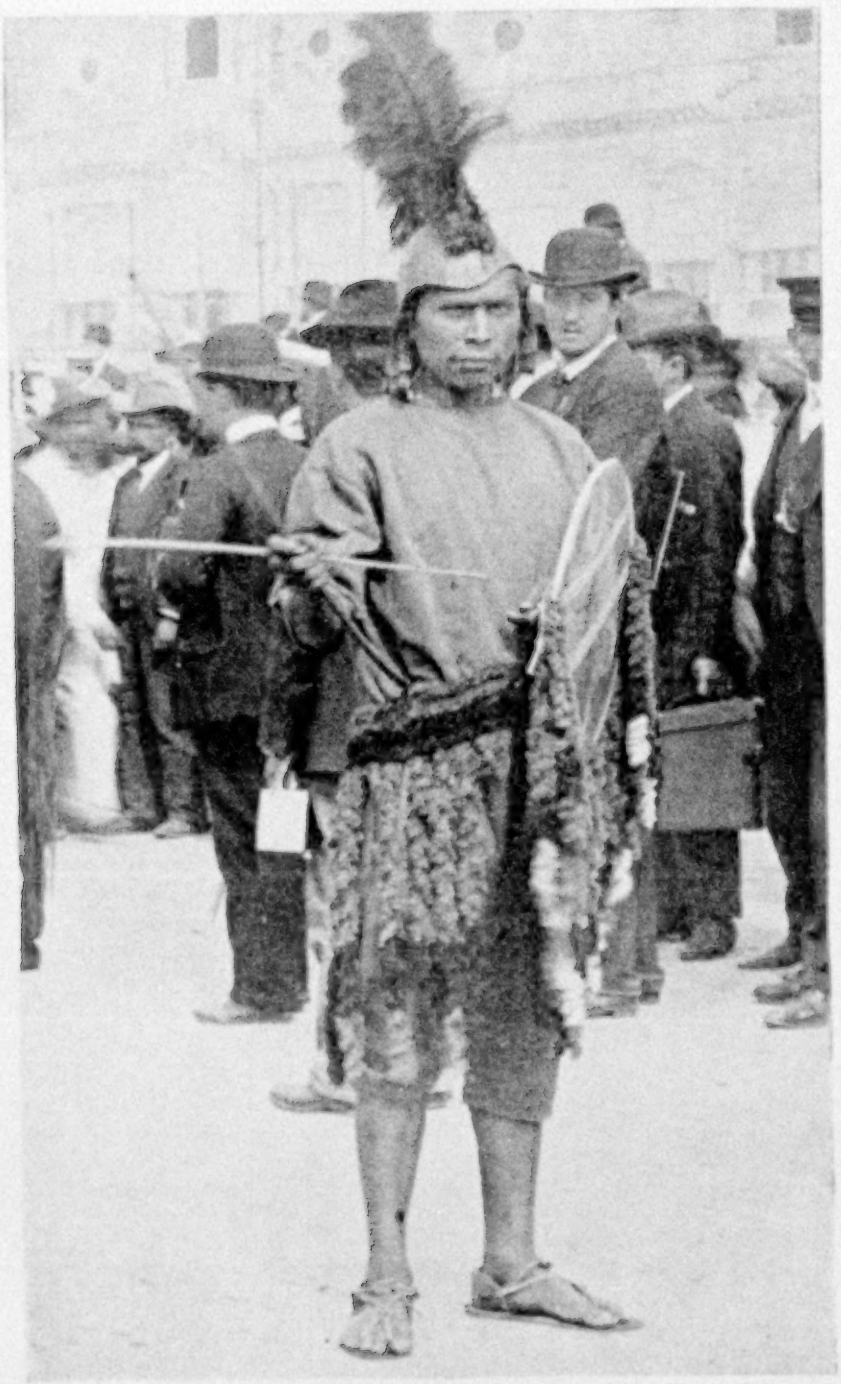
Marina, the Indian guide and mistress of Cortés, is a prominent personage in all histories of the Conquest of Mexico. This group illustrates the costumes prevailing in Mexico 400 years ago, and formed part of the historical pageant in celebration of the centennial of Mexico's independence.

Numerous private banks are scattered throughout the country, and the failure of several in late years has brought such drastic penalties upon the guilty parties as to discourage irresponsible enterprises.

The national debt of Mexico amounts to 218 million dollars. A part, bearing 5 per cent interest, has been quoted at par; the balance, paying 3 per cent, commands 70 to 75 cents on the dollar. Some of the 5 per cent bonds have been lately replaced by others yielding 4 per cent.

The government is also responsible for the bonds covering the railroad merger, by which Mexico controls the leading transportation systems, and for a mortgage bank operating under charter, which has for its function financing irrigation and agricultural development.

In the capital there is also a chartered bank, "Hipotecario," which loans money on improved properties at 9 per cent and issues against these 6 per cent bonds, the mortgages being automatically satisfied at the expiration of 25 years—a method somewhat akin to American building and loan associations.

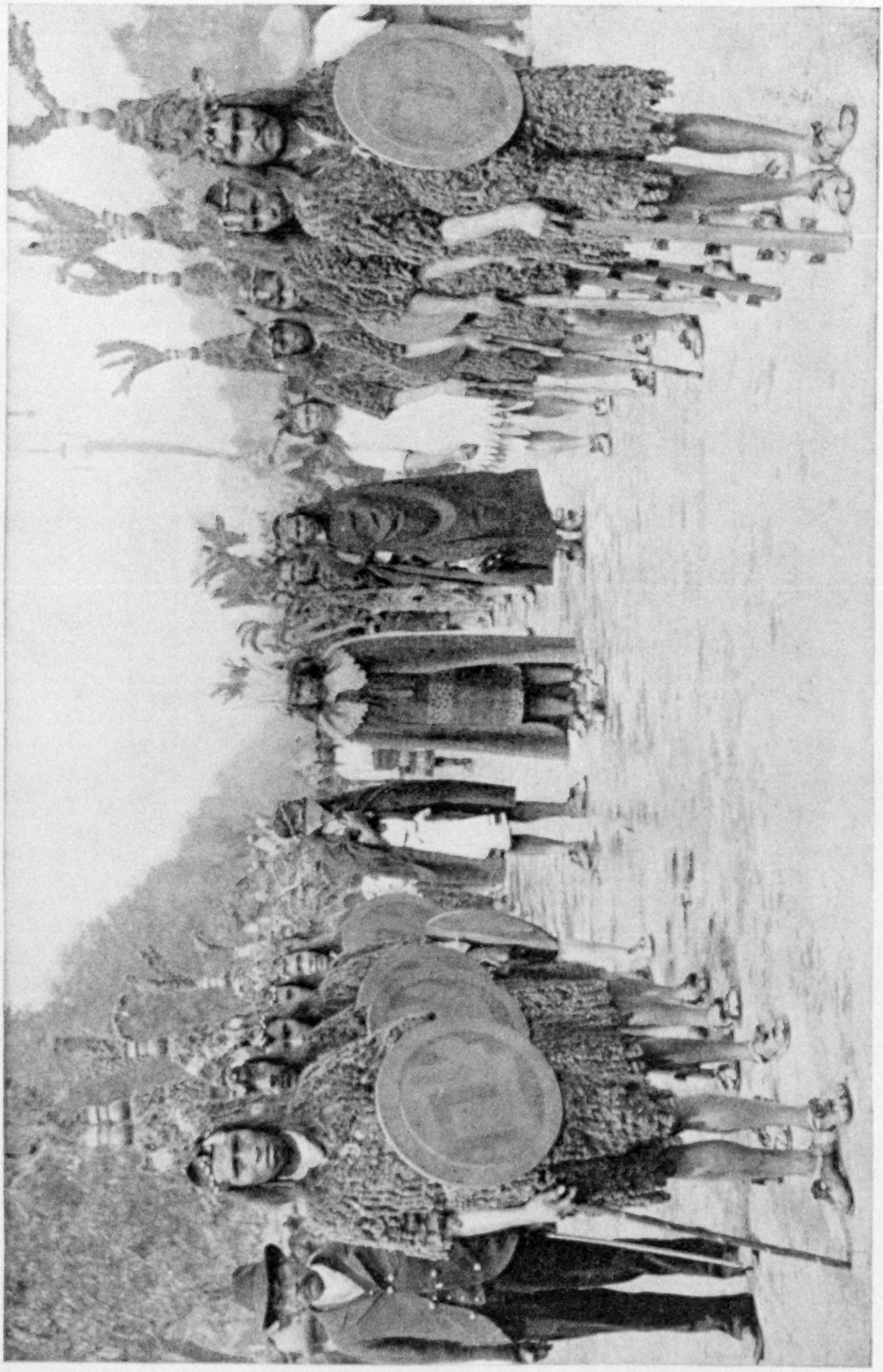


CAPTAIN OF MEXICANO WARRIORS (SEE P. 502)

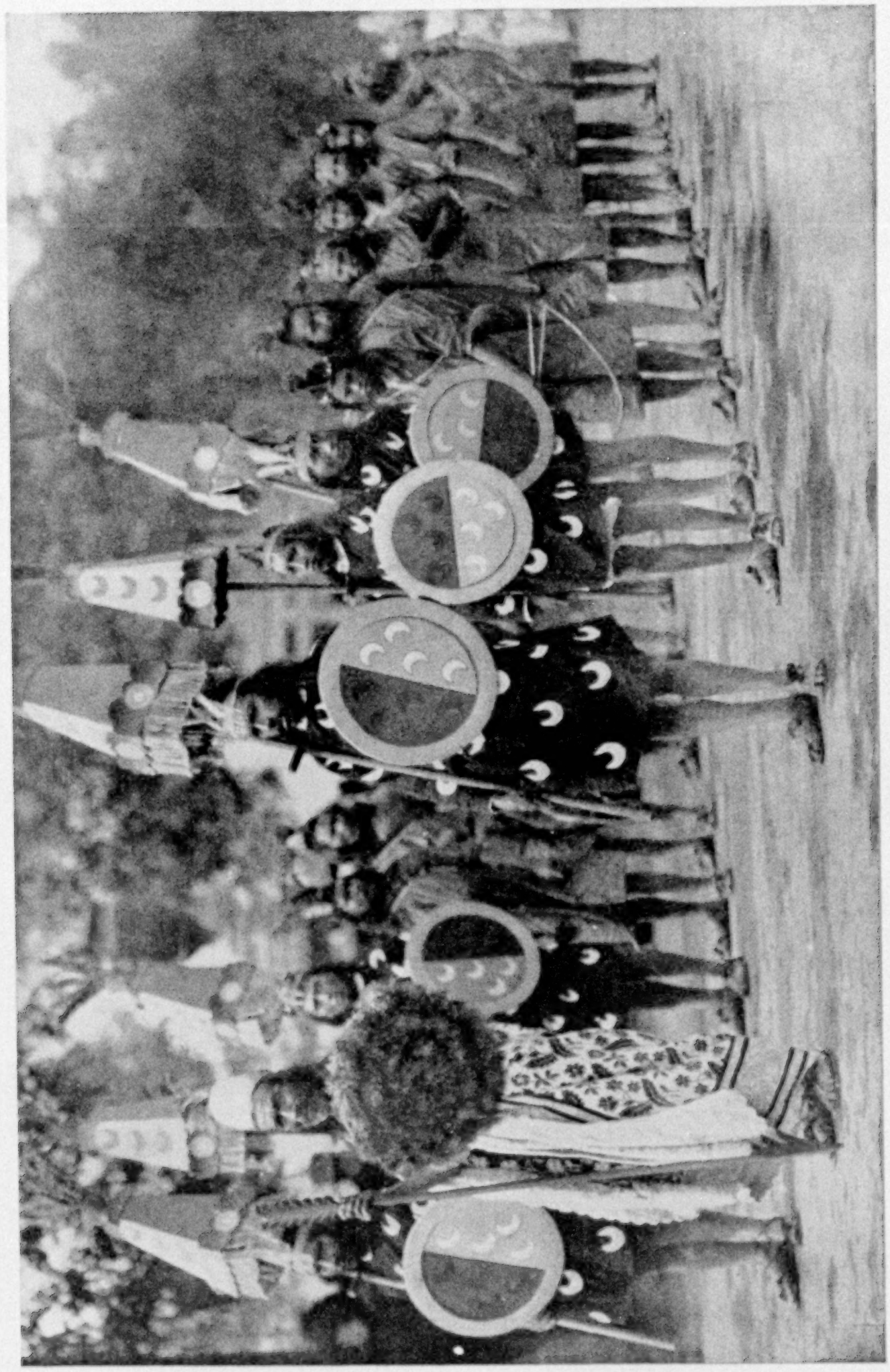
PRESIDENT DIAZ

Since our own Centennial, in 1876, Mexico has been peaceful and progressive; transportation, commerce, industries, and education have advanced. From a nation on the verge of bankruptcy it has risen to one whose credit is excellent, and all well-wishers of the country hope that the many evidences of progress, for which the execution if not the initiative are credited to General Porfirio Diaz, will not be retarded by protracted internal dissensions or by extraneous complications.

Unfortunately many of those who write of the Mexican President portray him either as an angel or a devil. The struggles of an orphaned Mixtecan boy and the subsequent life of a soldier are not apt to develop shoulder-blades into angel wings, especially where much of this life was spent in guerrilla warfare in rugged mountain country, accompanied by great hardship and privation. Neither are the recollections of capture, imprisonments, escapes, wounds, and torture calculated to soften; but these experiences have molded a character bold, decisive, dominant, which, exercised for the good of his country, means progress.



TLAXCALAN WARRIORS, SHOWING CACAMA, KING OF TEXCOCO, WITH CROWN OF FEATHERS



PRIESTS OF THE MEXICANO WARRIORS

The costumes, arms, and accessories were made as near as possible in harmony with those used 400 years ago

Reared to military discipline, his punishments are severe, and the enemies he has made are bitter in their opposition; but the mass of the people, while fearing his wrath, honor him for what his strong will, recognized ability, and patriotism have achieved for Mexico.

Those who see only evil in all that Diaz does and by reason of autocratic conditions place upon him the responsibility for all acts of subordinates, do injustice to Mexico and to its President.

Opportunity to judge President Diaz at close range, in his executive office in the National Palace and in his Chapultepec home, presented to the writer a manly man of strong personality and quick perception, prompt to act, courteous to callers, and evidently ready to give attention to suggestions which appeared to be for the ultimate good of his native land.

VALLEY OF MEXICO

The broad azotea of the castle of Chapultepec overlooks the City of Mexico, with its multitudinous flat-roof buildings accentuating numerous towers or domes of cathedrals and churches, and the few high buildings of modern construction. The imposing groves of ancient cypress trees in the adjacent park, Mexico's oldest inhabitants, have lived through many stirring epochs, for the ground occupied by this city has been stained with human blood as have few areas of equal extent. This was the site of Tenochtitlan, generally accredited to the Toltecs, a people who preceded the Aztecs; also the scene of the reputed magnificence of Montezuma's dynasty, described as a populous municipality, with excellent laws, established courts, able craftsmen, and evidences of a civilization long antedating the knowledge of our own portion of the continent—a civilization in strange contrast with human sacrifices on the Teocalli and cannibalism accredited to the Aztecs.

It was here that by a combination of skill, diplomacy, generalship, and fanaticism Cortés, with a relatively insignificant force, overpowered numbers and superstition and laid waste the Aztec capital.

The excesses, accompanied by loss of life, subsequently committed by the Inquisition in the name of religion for the aggrandizement of Spain, and in part glossed by the excellent structures which were built, need not be recounted.

But history tells of the numerous political convulsions which were initiated in or disturbed the city in the efforts of various aspirants to be leaders of the new republic, troops besieging or ravaging as one after another sought to establish himself as President, Emperor, Dictator. The investment by the United States troops, the capture of Chapultepec, and the fall of the capital; the occupancy of the city by the European allies, when Maximilian was enthroned, and its subsequent recapture by the Mexicans, aid in presenting a varied but sanguinary historical vista.

The protecting rim of mountains encircling the valley of Mexico; the snowy crests of Popocatepetl and Ixtaccihuatl; the quiet waters of the lakes, materially reduced in area by a comprehensive drainage system extending for 50 miles; the cultivated fields and the surrounding hamlets, each with its church; the lines of smoke from industrial chimneys and locomotives, combine to suggest peace and prosperity, which all hope may continue in our neighbor, Mexico.

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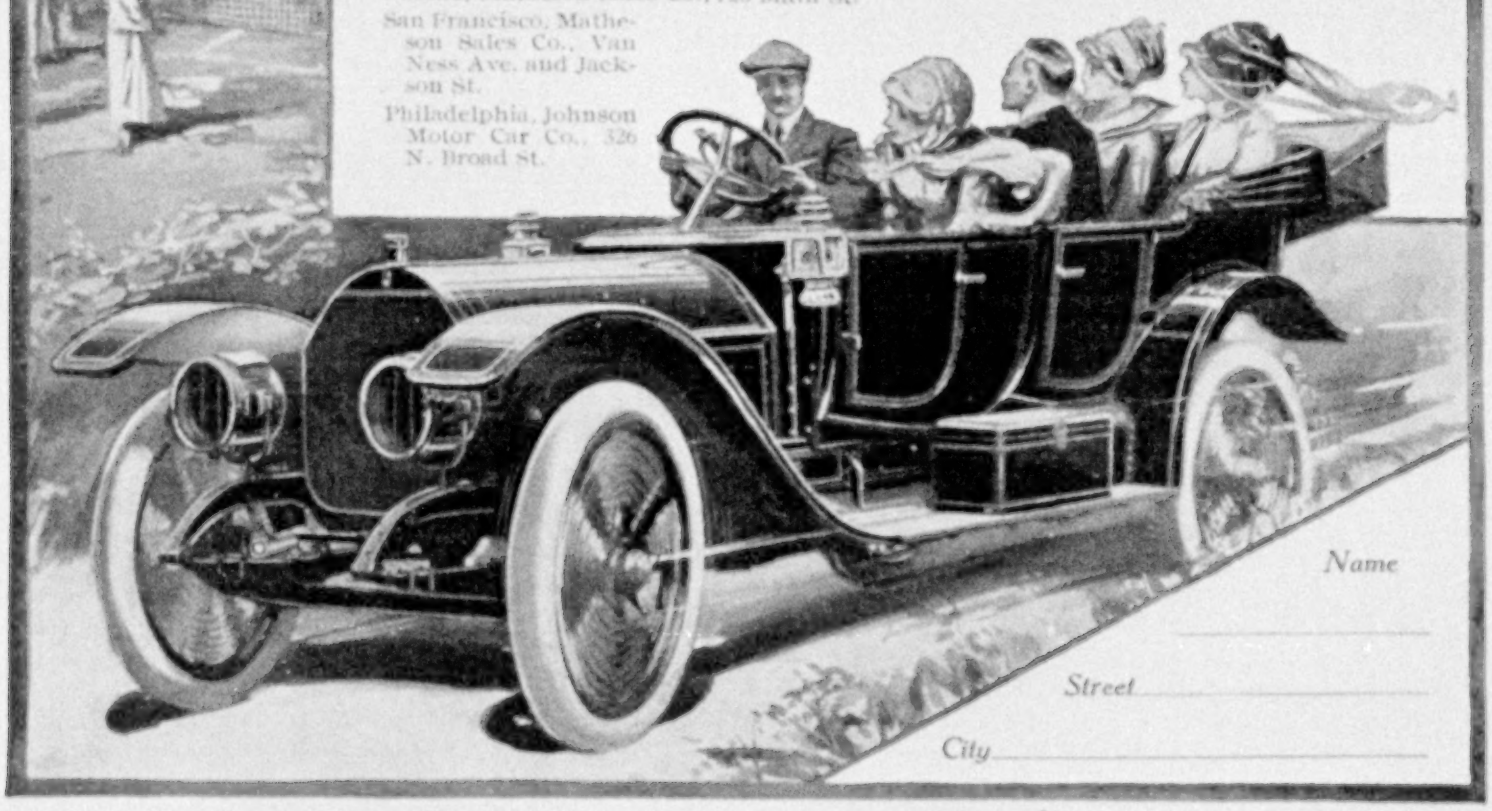

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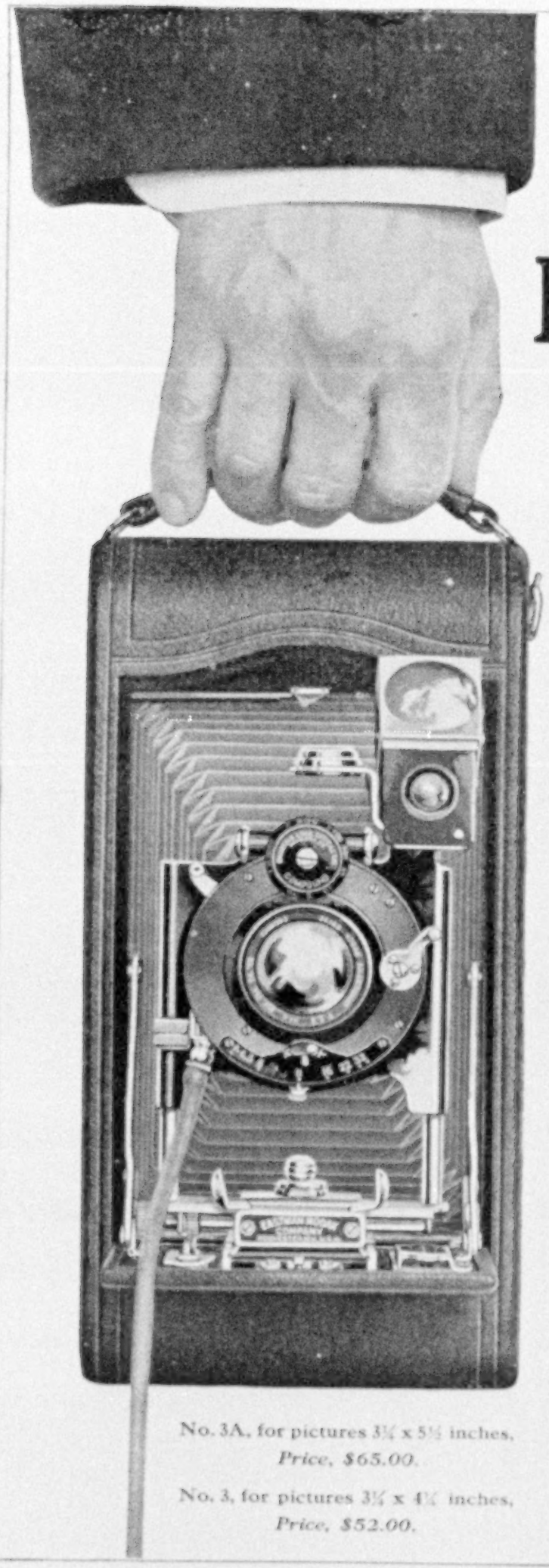

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By Romeyn Beck Hough

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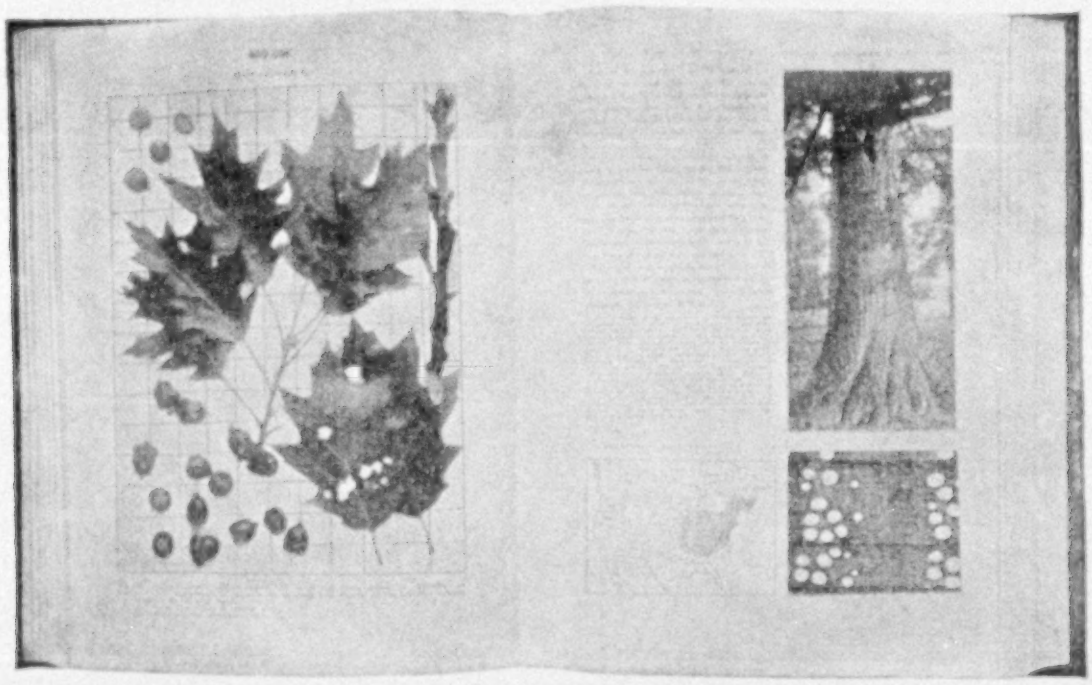

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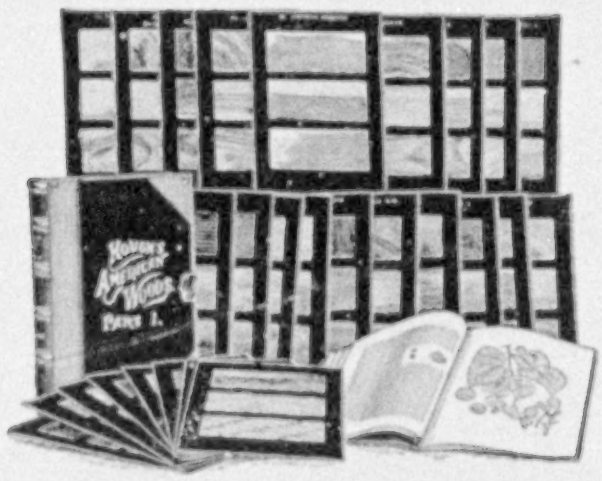

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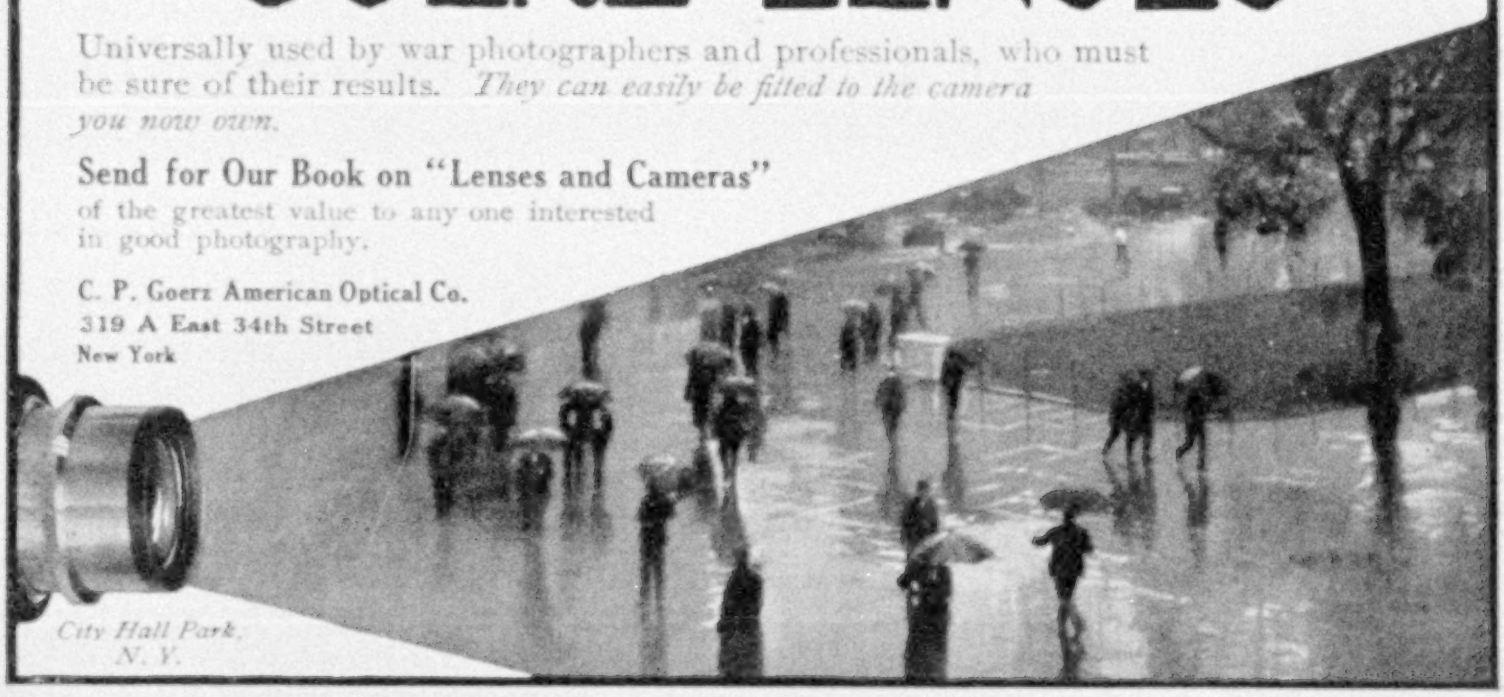

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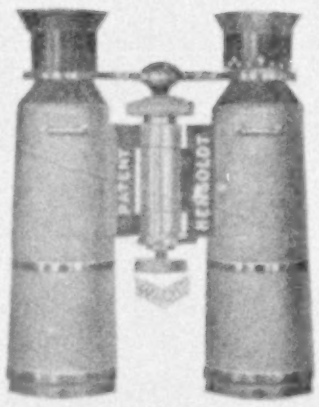

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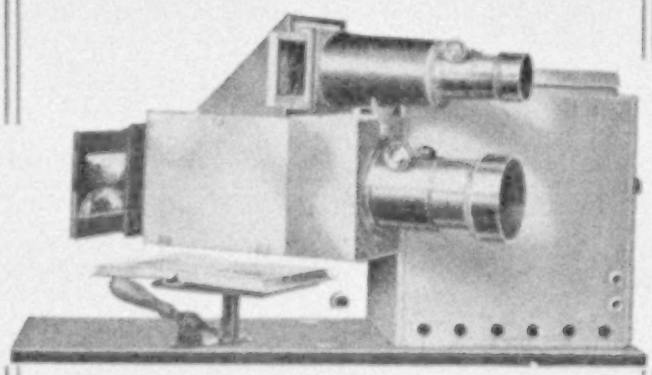

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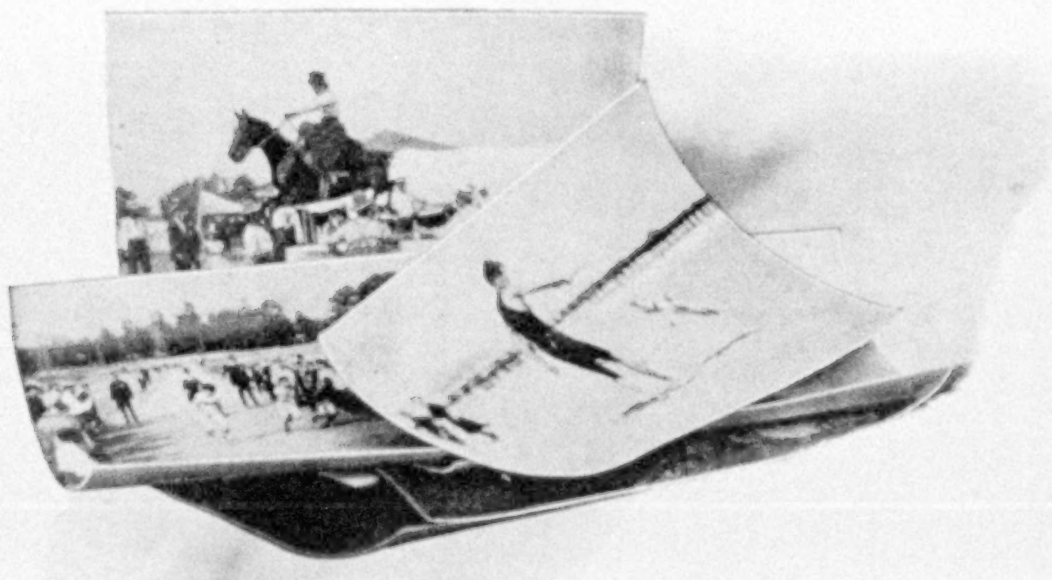

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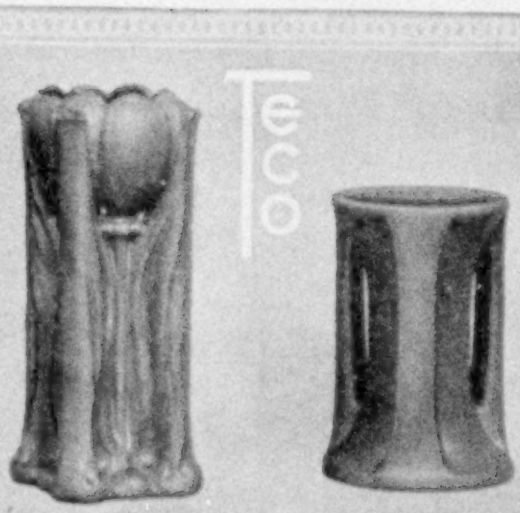

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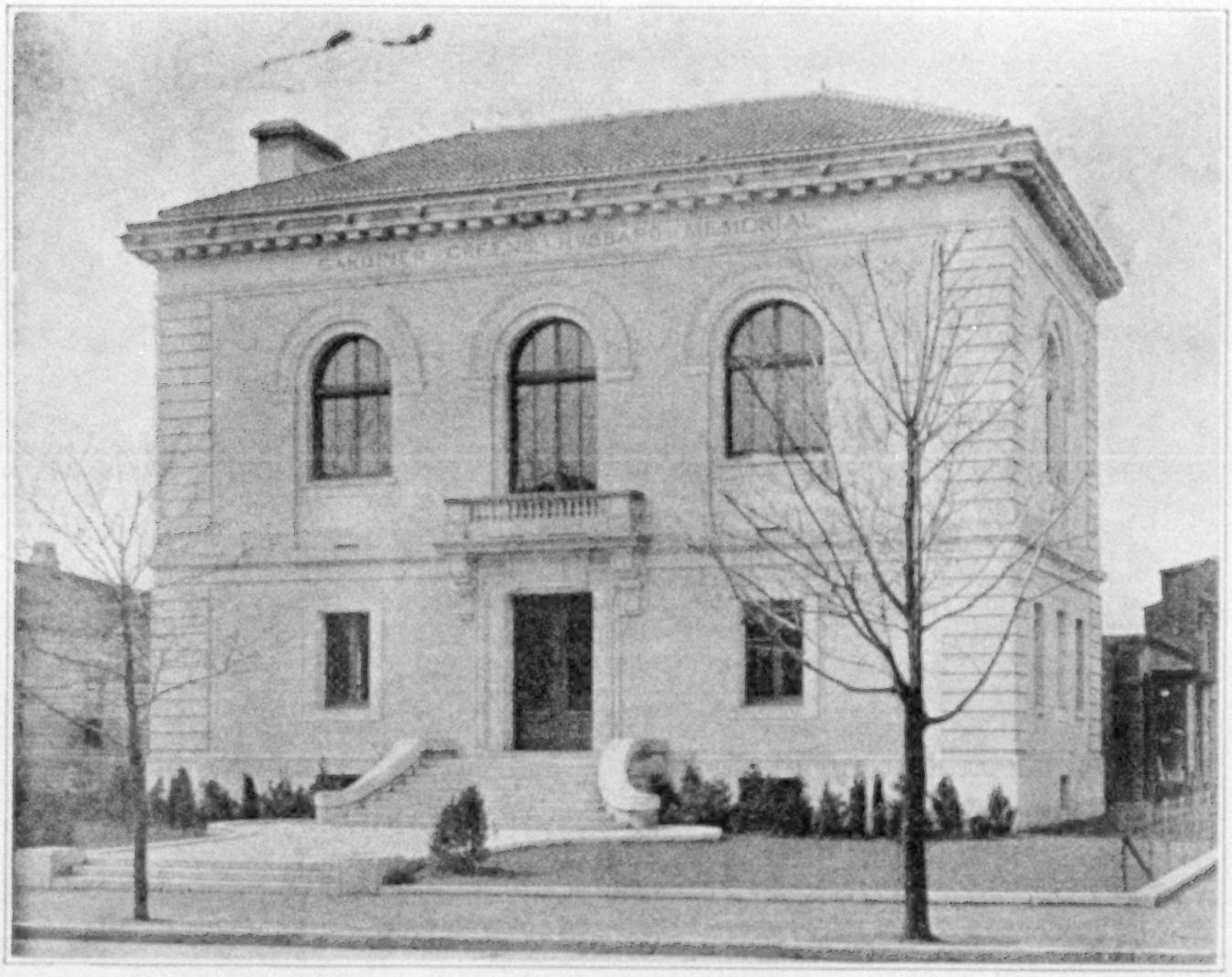

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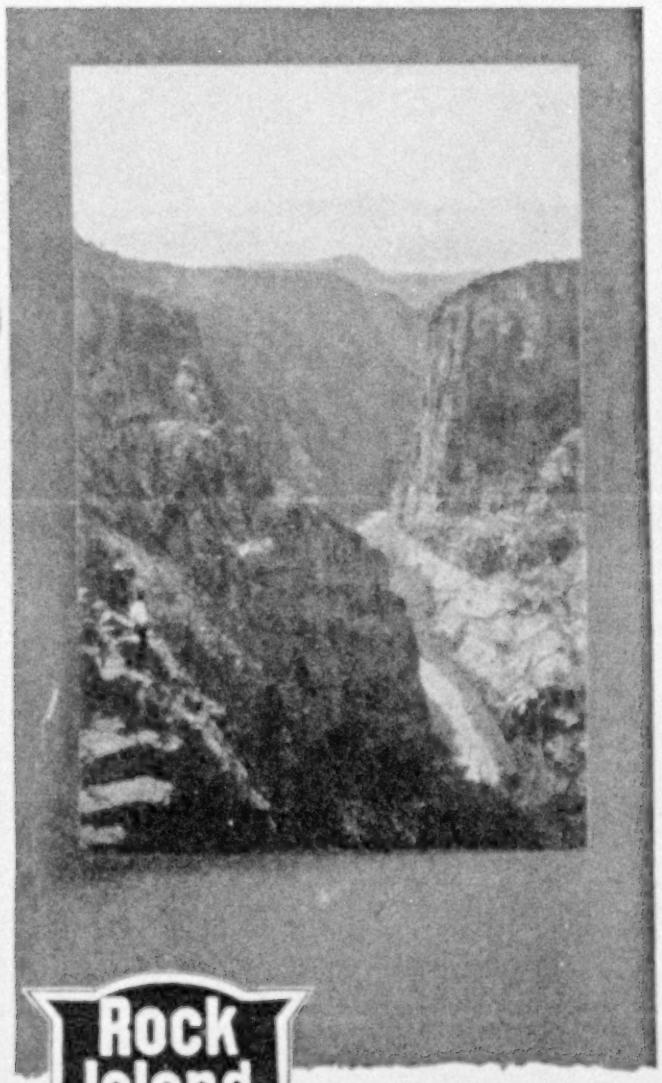

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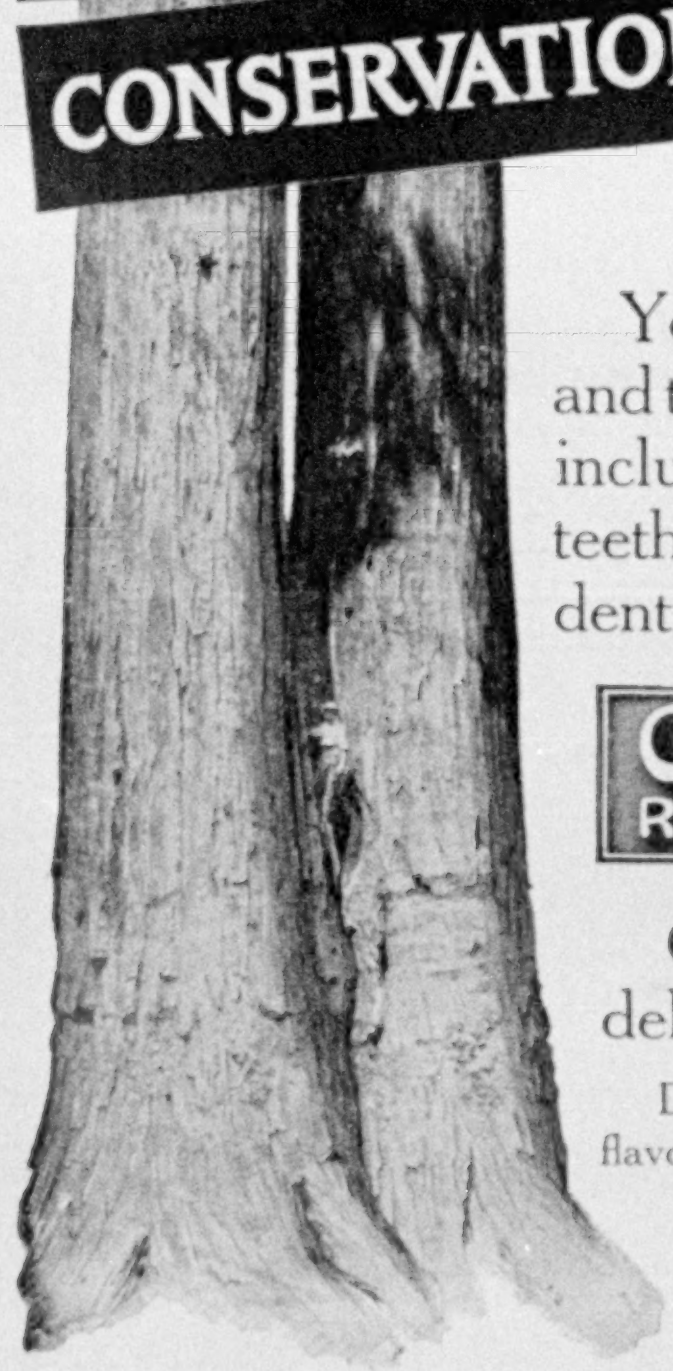

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